

Petroleum Resource Potential of Northern Mainland Sedimentary Basins of the Mackenzie Corridor

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Abstract

The objective of this multidisciplinary project is to assess the hydrocarbon resource potential of the Mackenzie Valley using quantitative and qualitative geoscience data. The study is a collaboration among the Geological Survey of Canada, the Northwest Territories Geoscience Office, the Yukon Geological Survey, industry, universities, and northern communities.

The eastern portion of the Northern Canadian Sedimentary Basin rests unconformably on the westward extension of the Canadian Shield and includes Paleozoic carbonates, evaporates, and siliciclastic rocks overlain by Mesozoic and Tertiary siliciclastic rocks. The western part of the study area is characterized by diverse structural trends, fold bundles and faults, and consists of deformed Proterozoic to Cretaceous strata.

Although significant hydrocarbon discoveries have been made along the Mackenzie Valley, several exploration regions are still poorly understood. Insufficient stratigraphic, structural, and geochemical data preclude a comprehensive assessment of some areas. Several exploration plays will be the focus of future work, such as the Plateau Thrust play in the Mackenzie Mountains, fault traps within Cambrian and Devonian sandstones and carbonates, and stratigraphic and structural plays in Mackenzie Arc. Fieldwork in 2006-2007 will be conducted to 1) examine stratigraphic sections and evaluate potential source and reservoir facies, 2) collect samples for organic geochemistry analysis, 3) study the role of structural features as hydrocarbon conduits, and 4) assess the viability of probable structural and stratigraphic traps. Reconnaissance field studies in Peel Plateau and Plain in 2005 provided preliminary data including total organic carbon/Rock-Eval values, Ordovician to Devonian conodonts for biostratigraphy, and conodont colour alteration indices.