

**Addressing Geoscience Knowledge Priorities in the Northwest Territories:
Basin Analysis of Peel Plateau and Plain Region, northern Mackenzie Corridor***

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The Northwest Territories Geoscience Office (NTGO) supports the development of geoscience projects with outcomes similar to those of the Geological Survey of Canada's (GSC) Northern Resources Development Program. These include increasing investment in northern energy resources by stimulating exploration activity and supporting the Northwest Territories (NWT) as a significant contributor to Canada's energy supply. An inadequate geoscience knowledge base impedes exploration, investment, and development. Peel Plateau and Plain (Peel Region) is a prospective but under-explored region in NWT that will be the focus of a multi-year, integrated geoscience project. This project was conceived following a client workshop in September 2004, and a workplan with deliverables and target results will be finalized by March 2005.

The Peel Region contains relatively undeformed strata of the Interior Platform that lie west of the Mackenzie River in proximity to the proposed Mackenzie Gas Project pipeline route. Deformed strata of Richardson Mountains and Mackenzie Mountains border the Peel Region to the west and south, respectively. The supracrustal wedge tapers eastward and is composed of two distinct stratigraphic packages: a Paleozoic "passive" margin succession overlain by strata deposited in a Mesozoic foreland basin setting akin to the Western Canada Sedimentary Basin. Although there have been no major petroleum discoveries to date, the Peel Region is attractive as a prospective petroleum province.

The lack of a detailed stratigraphic framework with biostratigraphic control, coupled with discrepancies between existing surface and subsurface stratigraphic nomenclature preclude a comprehensive basin analysis of the region. To address these and other knowledge gaps, a multi-disciplinary team will examine stratigraphic correlation, depositional systems, biostratigraphy, and thermal maturation histories with the goal to better understand the area's petroleum systems and potential. The project will be managed by NTGO with participation from GSC, university, and industry partners. One initial area of focus will be a field-based study of the Lower Paleozoic succession (Mackenzie-Peel Shelf to Richardson Trough) complemented by subsurface data and laboratory-based investigations of microfossils, petrology, and geochemistry. The goals are to: 1) document and correlate surface and subsurface stratigraphy including sedimentary facies distributions, biostratigraphy, and nature of regional unconformities, 2) elucidate the sedimentary history including responses to tectono-stratigraphic events and sea level changes, and 3) refine assessments of hydrocarbon potential in the strata. Our map of the Peel Region shows a preliminary compilation of existing data in the study area and identifies knowledge gaps that will be addressed by this new petroleum geoscience project.

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