

Structure, Stratigraphy and Hydrocarbon Potential of the Central Whitehorse Trough, Northern Canadian Cordillera

Joseph M. English*, Stephen T. Johnston and Kara L. Wight
SEOS, University of Victoria, PO Box 3055, STN CSC, Victoria, BC V8W 3P6
englishj@uvic.ca

Gary G. Johannson
Canadian Discovery Ltd., Calgary, AB

Mitchell G. Mihalynuk
B.C. Ministry of Energy and Mines, Victoria, BC

and

Martin Fowler
Geological Survey of Canada, Calgary, AB

ABSTRACT

The Whitehorse Trough is an early Mesozoic marine sedimentary basin, which extends from southern Yukon to Dease Lake in British Columbia. This paper outlines the stratigraphy and structure of the central Whitehorse Trough and assesses the overall hydrocarbon potential of this region. Strata within the central Whitehorse Trough include carbonate rocks of the Upper Triassic Sinwa Formation, and interbedded sandstone, siltstone and argillite of the Lower Jurassic Inklin Formation. The central Whitehorse Trough is structurally dominated by a Middle Jurassic southwest-vergent fold and thrust belt. Programmed pyrolysis data indicate that potential source rocks in the Inklin Formation are gas-prone, and are within the oil and gas windows along the northeastern flank of the central Whitehorse Trough. Variably tuffaceous feldspathic arenite in the Inklin Formation have fair to good reservoir characteristics, but are a minor component of the stratigraphy. Potential hydrocarbon traps are provided by antiforms, thrust faults, and stratigraphic pinch-outs. Three conceptual gas plays for the central Whitehorse Trough are proposed: (1) the Sinwa Structural Gas Play, (2) the Inklin Structural Gas Play, and (3) the Inklin Stratigraphic Gas Play. The Inklin Structural Gas Play presents the greatest potential in the central Whitehorse Trough as levels of organic maturation are favourable along the northeastern flank of the basin and structural traps are readily identifiable; this belt may extend to the northeast beneath the structurally overlying Cache Creek terrane.