

## **A Petroleum Events Chart for the Whitehorse Trough, Yukon**

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The Whitehorse Trough in southern Yukon is a frontier basin that is thought to contain gas and possibly oil. It formed in the early Triassic as a forearc basin between the ancient North American margin to the east and the volcano-plutonic Lewes River arc to the west. Strata in the Trough consists of three main units: 1) the Lewes River Group (Upper Triassic), a shallowing-upward sequence of volcanics, volcanoclastics, deepwater clastics and carbonates, and shallow-water clastics and carbonates, informally subdivided into the Povoas and Aksala formations; 2) the Laberge Group (Lower-Middle Jurassic), a shallowing-upward sequence of deepwater clastics, dacite tuff, and shallow marine to fluvial coal-bearing clastics, informally subdivided into the Richthofen, Nordenskiold and Tanglefoot formations; and 3) the Tantalus Formation (Jura-Cretaceous), a fluvial coal-bearing sequence of clastics. Based on Rock-Eval analysis, vitrinite reflectance, and the color of microfossils, the Tanglefoot and Tantalus formations are interpreted as potential source rocks and possibly effective source rocks. Fractured limestone in the Aksala formation and sandstone in the Tanglefoot and Tantalus formations are potential reservoir rocks, where as the Povoas formation and mudstone in the Aksala, Richthofen, Tanglefoot and Tantalus formations are potential seal rocks. Stratigraphic traps (pinchouts) and structural traps (northward trending anticlines and high-angle faults) are present, with structural traps culminating in the early Middle Jurassic. Generation, migration, and accumulation of hydrocarbons may have begun in Late Jurassic time. The northernmost part of Whitehorse Trough is the most prospective area for hydrocarbon exploration (i.e., Division Mountain, Tantalus Butte and Five Finger Rapids).