

Summary of the Stratigraphy, Sedimentology and Hydrocarbon Potential of the Laberge Group (Lower-Middle Jurassic), Whitehorse Trough, Yukon

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Summary

Whitehorse trough is a northwestward tapering belt of Upper Triassic to Lower Cretaceous volcanic and sedimentary rocks extending ~650 km from the British Columbia-Yukon border, north to the vicinity of Carmacks in south-central Yukon. It consists of three main stratigraphic units (i.e., the Lewes River Group, Laberge Group and Tantalus Formation) representing three sedimentary basins partially overlapping in space and time.

The Laberge Group (Lower-Middle Jurassic), informally subdivided into the Richthofen, Tanglefoot and Nordenskiöld formations, was deposited in the Laberge basin, a collapsing forearc basin in which the arc was undergoing uplift and erosion. The Richthofen formation consists of conglomerate, massive sandstone, sandstone-mudstone couplets, volcanoclastics and minor limestone interpreted as submarine fan systems. The Tanglefoot formation consists of coal-bearing sandstone, mudstone, conglomerate, volcanoclastics and minor limestone interpreted as delta systems and shallow marine deposits. The Richthofen and Tanglefoot formations are the same age (i.e., Sinemurian to Bajocian), but the Richthofen formation is restricted to the southern half of the basin, whereas the Tanglefoot formation occurs in the northern half. The Nordenskiöld formation consists of subaerially erupted, resedimented volcanoclastics deposited mainly during Pliensbachian time.

The Richthofen formation is interpreted as a spent source rock and the Nordenskiöld formation is not a source rock. The Tanglefoot formation is interpreted as a potential source rock and possibly an effective source rock. It contains petroleum fluid inclusions (mainly 23°- 32° and 40°- 44° API gravity) indicating a minimum trapping temperature of 110-115 °C. The Tanglefoot formation is also a potential reservoir rock.