

Permian Jungle Creek sandstones and conglomerates of the Eagle Plain Basin, Y.T.

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ABSTRACT

Gas-bearing Permian Jungle Creek Formation reservoirs occur in the Blackie Field of southern Eagle Plain Basin, Yukon Territory. Core from Blackie M-59 (2115-2194ft., 2357-2377ft.) and Birch E-53 (1331-1830ft.) shows representative Jungle Creek lithofacies including mudstone, sandstone, pebbly sandstone, and interbedded sandstone and conglomerate. Sandstones (very fine- to very coarse-grained) show a range of structures and textures including: wavy bedding, ripples, and flasers (very fine- to fine-grained), planar lamination and cross-bedding (fine- to medium-grained), and pebbly sandstone (up to very coarse-grained). Interbedded sandstones and conglomerates show low angle planar to wavy bedding (defined by grain size variations) with sharp to abruptly gradational contacts. Conglomerates (avg. clast size granule to small pebble) commonly show sand-supported textures, with fine- to coarse-grained matrix sand. Sandstones and conglomerates are litharenites that are dominated by quartz and chert framework grains (chert content increasing with increasing grain size). Calcitic bioclasts occur in minor to moderate amounts at Blackie M-59. Principle cements include calcite, quartz overgrowths, dolomite (minor), and siderite (trace/minor). A dominant control on porosity and reservoir quality at M-59 is the occurrence of early calcite cement, and secondary dissolution of calcite. Reservoir quality (up to $\phi=23.3\%$ and 1 darcy in conglomerates at E-53) generally increases with grain size. The Jungle Creek succession, represented by siliciclastics interfingering, in part, with marine carbonates, is consistent with marine fan-delta deposits. The fan delta deposits, interpreted to flank bald paleotopographic highs, are analogous to large oil accumulations associated with Chinese "buried hills". The occurrence of fan delta deposits signifies the presence of paleotopographic relief during sedimentation, therefore, one can anticipate the discovery of similar Permo-Carboniferous deposits in the Eagle Plain Basin associated with intra-Paleozoic structural highs.