FACIES DESCRIPTION OF THE LATE JURASSIC SWIFT FORMATION, SOUTHEASTERN ALBERTA: AN UNLIKELY OIL RESERVOIR DEPOSIT

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Lithologic description of the Swift Formation (Uppermost Ellis Group, Late Jurassic Age) southeastern Alberta, was done by core logging and lithologic interpretation of geophysical logs.

Preliminary facies analysis of the Swift sediments reveals the following major lithofacies up-section: (1) a weakly cemented mudstone/shale with few sedimentary structures; (2) a silt-streaked, lenticular mudstone; (3) "the dark ribbon sand" — an interlaminated siltstone and organic mudstone, with some silt and rich in both glauconite and pyrite; (4) "the light ribbon sand" — a light coloured, organic-poor, interlaminated siltstone and silty mudstone with abundant siderite near the top; (5) a poorly sorted silty sandstone with spherulitic siderite and a rooted top. Within the ribbon sands, three additional facies occur: (6) intensely bioturbated sediments; (7) epsilon crossbedded, interlaminated siltstones and mudstones; and (8) stringers and lenses of coarser sand.

Macroscopically, the reservoir ribbon sands appear to be an unlikely oil reservoir. The mud laminae, however, are not laterally continuous. Burrowing provides integrated passageways between the silt/sand laminae. The ribbon sands are weakly cemented by kaolinite which also loosely fills many of the adjacent pores, increasing microporosity within the ribbon sand facies. Petrographic and SEM work shows further development of secondary porosity and permeability by feldspar dissolution and microfracturing.