

Cambrian reservoirs of the Tweed Lake Gas Field, Colville Hills, N.W.T

Angela Kolisnik*, Peter Putnam, and Brian Davies
Petrel Robertson Consulting Ltd., 736 - 8 Ave. S.W., Calgary AB, T2P 1H4
akolisnik@petrelrob.com

ABSTRACT

Cambrian sandstones of the Mount Clark Formation form the reservoir for gas and condensate discoveries in the Tweed Lake Gas Field of the Colville Hills area of the Canadian Northwest Territories. Core from Tweed Lake A-67 (1276.0-1302.1m) shows contacts between lowermost Proterozoic volcanics and overlying Lower Cambrian Mount Clark Fm. (sandstones and mudstones), and between the Mount Clark and overlying Lower to Middle Cambrian Mount Cap Fm. (dolomite). The Mount Clark can be subdivided (from bottom to top) into: cross-bedded sandstone, bioturbated sandstone, a mudstone interval, and an upper coarsening- or sanding-upwards interval of bioturbated sandstone. The cross-bedded sandstone lithofacies shows predominantly fine- to medium-sand size with bedding highlighted by prominent grain size variations (up to coarse-grained). Bioturbated sandstones (very fine- to coarse-grained) are locally argillaceous and show churned, massive, or finely laminated textures, locally abundant glauconite, and long, vertical *Skolithos*-like burrows. The Mount Clark sandstones are quartz arenites and subarkoses, with detrital feldspars concentrated within the silt to very fine size fraction. Cement phases include silica, authigenic clays, dolomite, bitumen, and barite. The best reservoir quality (up to $\phi=13.2\%$ and 8.28md) is associated with medium to coarse-grained sand showing mostly modified primary intergranular type porosity. The Mount Clark section is interpreted as lowermost fluvial-tidal sediments (cross-bedded) succeeded by the development of sandy, tidally-influenced deposits that pass upwards into shelfal and shoreface successions. Ultimate marine deepening resulted in the generation of muddy dolomitic units of the Mount Cap Formation. Although well control intersecting Cambrian beds is limited mainly to the Colville Hills area, potential Cambrian reservoirs may be more widely distributed than portrayed in the published literature. Comparison with the highly prolific, but much more deeply buried, Cambrian reservoirs of Algeria suggests that there are many similarities.