

Reservoir Characterization of Bioturbated Tight Gas Reservoirs

Greg M Baniak¹, Murray K. Gingras², and S. George Pemberton²

¹BP Canada Energy Group, Calgary, Alberta, Canada (Greg.Baniak@bp.com)

²Technology Research Group, University of Alberta, Edmonton, Alberta, Canada

Abstract

A thorough analysis of dolomitized burrows, and their influence on reservoir quality, was completed on the Upper Devonian Wabamun Group in the Pine Creek gas field of central Alberta, Canada. Using spot-permeametry measurements, the dolomitized burrows are found to have permeabilities ranging between 1 and 350 millidarcies (mD). Conversely, the lime mudstone-wackestone matrix that surrounds the burrows commonly has permeabilities of less than 1mD. Numerical modeling revealed that bulk reservoir permeability is best estimated using the harmonic and geometric mean in scenarios where burrow-associated dolomite is minimal. On the other hand, the arithmetic mean best estimates bulk reservoir permeability in scenarios where burrow-associated dolomite is moderate to high. Collectively, the Wabamun Group represents a reservoir where much of the natural gas that is stored within the matrix is produced through the higher permeable burrows. This burrow-matrix association is herein referred to as Ichnofossil Hosted Tight Gas (IHG).

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