

Reservoir Architecture of a Fine-grained Turbidite System from Outcrop Exposures of the Triassic Montney Formation, Western Canada Sedimentary Basin

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The Lower Triassic Montney Formation of Alberta and British Columbia was deposited in a ramp setting on the margin of the North American craton. Deposition of fine-grained turbidites was strongly influenced by extensional tectonics resulting in a rapid lateral facies variability and reservoir heterogeneity. A relatively recent exploration play in a mature hydrocarbon basin, turbidite sandstones have reserves exceeding 1 TCF of liquids-rich gas in Valhalla-La Glace, Glacier, Knopik and Sinclair fields, west-central Alberta. Limitations of existing reservoir models are due to a reliance on well logs and limited cores from relatively widely spaced wells.

Recent field work has shown that the turbidite reservoir fairway extends 100 km basinward into the Front Ranges, British Columbia outcrop belt. Three-dimensional exposures provide for characterization of Montney turbidite reservoirs through quantification of lateral and vertical lithologic variability, sandstone geometry and facies heterogeneity.

In outcrop, Montney turbidites occur in channel, levee/overbank, and lobe/sheet sand facies associations. Sandstone channels have a lenticular geometry, 40:1 width/ thickness ratios, and grade laterally to levee/overbank deposits of interlaminated very fine-grained sandstone, siltstone and shale. Current ripple laminae and convolute bedding are common. Lobe/sheet sand bodies consist of laterally extensive, amalgamated very fine-grained sandstone beds. Individual sand sheets are primarily massive and homogenous. Sand/shale ratios vary from 9:1 to 1:1 in proximal through distal facies.