

Reservoir Variability of the Glauconitic Sandstone (Mannville Group, Lower Cretaceous) in the Jenner Upper Mannville “E” Pool, southeast Alberta

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ABSTRACT

The Jenner Upper Mannville “E” Pool in southeast Alberta contains an estimated 33 million barrels of in-place oil, and currently produces from the Albian Glauconitic Sandstone (Mannville Group). An integrated study of detailed core description, geophysical wireline logs, petrography, and production data from 106 wells has been carried out in order to better understand reservoir distribution and performance within the pool.

In the study area the Glauconitic Sandstone may be subdivided into three constituent units: a lowermost marine unit with open and restricted-marine shoreface deposits, a middle fluvial unit with channel lag, point bar, abandoned channel, and overbank deposits, and an uppermost tide-dominated estuarine unit with subtidal channel, tidal flat, and supratidal mudflat and paleosol deposits. The fluvial unit is the primary reservoir; moderate oil-staining of shoreface deposits and localized homogenization of fluvial and marine strata by firmground burrowers indicate a potential bypassed zone. The estuarine unit is locally impermeable and acts as a stratigraphic seal.

Internally, the fluvial reservoir unit contains four distinct lithofacies: cross-stratified sandstone, chert pebble conglomerate, massive sandstone, and shaly sandstone. Average permeability of these strata are 940 mD, 1686 mD, 658 mD, and 226 mD, respectively. As expected, the most productive wells occur in strata of the first three facies, which preferentially are located in the northern and southern portions of the pool. Poorer reservoir quality shaly sandstone, on the other hand, occurs in the central part of the pool.