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Stratigraphy and Sedimentology of the Lower Cretaceous (Albian) Glauconitic Member (Mannville Group) in the Jenner Upper Mannville "E" Pool, Southeast Alberta, Canada: Implications for the Development of an Established Oil Reservoir

Deposition of the Albian Glauconitic Member (Mannville Group) in southeast Alberta followed a fall in relative sea level and the establishment of a number of broad paleovalleys that incised older barrier and coastal plain deposits. Initially the paleovalley began to fill with sediment from an extensive system of fluvial and tidal channels; it is these strata that form the primary reservoir. An ensuing transgression drowned the paleovalley and established estuarine conditions characterized by a suite of distinctive wave- and current-dominant stratification and brackish-water trace fossils; it was under these conditions that non-reservoir strata were deposited.

The Jenner "E" Pool in southeast Alberta currently produces oil from the Glauconitic Member and contains an estimated 33 million barrels of oil in place. Locally, the reservoir sandstone body is stratigraphically trapped by later-stage, impermeable lithic channel-fills that partially incise strata of the Glauconitic Member. Internally, the reservoir contains four distinct lithofacies: well-sorted moderate- to high-angle cross-stratified sandstone, matrix-supported chert pebble conglomerate, massive to faintly low-angle cross-stratified sandstone, and interbedded shaley sandstone.

Reservoir quality (porosity and permeability) varies significantly between lithofacies, and as a consequence successful development of the Jenner "E" Pool depends on recognizing the lateral and vertical distribution of the constituent lithofacies. Relatively permeable sandstone and conglomerate lithofacies are located in the northern and southern portions of the pool whereas impermeable interbedded shaley sandstone lithofacies occur in the central part of the pool.