

Reservoir Architecture of the Middle Jurassic Upper Shaunavon Member in the Whitemud Pool – SW Saskatchewan

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This study presents the reservoir architecture and characterization of one of the four shoreface sequences within the middle Jurassic Upper Shaunavon Member in the Whitemud Pool area in SW Saskatchewan, located at T5-20W3M. The Upper Shaunavon Member rests unconformably on the lower Shaunavon carbonate platform. The Whitemud Pool was discovered in 1963, and is characterized by a very low recovery factor of 2.8%, with a cumulative production of 1.5 million barrels of the estimated 56 million Bbl of oil in place within the pool. The oil is medium gravity with an API ranging between 20-22.

The Upper Shaunavon Member has been divided into four depositional sequences; Upper Shaunavon A to D, where all four contain both siliciclastic and carbonate reservoirs. This study focuses primarily on the Upper Shaunavon B shoreface sandstone, the thickest and most productive interval within the Whitemud Pool. Initially operators targeted the high permeability shell hash (1-500mD) present locally at the base of the Upper Shaunavon B shoreface as a means to drain the overlying lower permeability Upper Shaunavon B shoreface sandstones (0.1-10mD). The northeast-southwest trend of the Whitemud Pool reflect the depositional trend of the shell hash underlying the Upper Shaunavon B shoreface sandstones, the main target for the original drilling in the 1960-1970s.

Detailed core observations in the Whitemud Pool area confirmed that the Upper Shaunavon B shoreface sandstones have a much larger depositional extent than the shell hash unit and that the shoreface sandstones are oil stained and have reservoir quality properties in a broad area outside the existing pool. This suggests significantly untapped reserves are present and that additional drilling opportunities exists in the Whitemud Pool area targeting the more widespread lower permeability Upper Shaunavon B shoreface sandstones, especially with the application of new horizontal drilling and completion technology.