

EXPANDING SASKATCHEWAN'S LATE DEVONIAN-EARLY MISSISSIPPIAN BAKKEN FORMATION OIL PLAY OUTSIDE THE CURRENT PRODUCING AREAS IN SOUTHEASTERN SASKATCHEWAN

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Abstract

Saskatchewan's Bakken Formation oil "boom" is currently in its tenth year (2005-2014), and there has been over 21 million m³ (132 million barrels) of oil produced at over 10,500 m³/day (66,000 barrels/day) as of July 2013. The number of wells producing from southeastern Saskatchewan's Bakken Formation has risen from just 75 wells (end 2004) to over 2,700 wells (July 2013). This has primarily been a result of favourable economics and the implementation of horizontal wells combined with multistage fracturing to access extremely low permeability reservoir rocks (<1 mD).

The vast majority of the recent (2005-2014) Bakken Formation oil production in southeastern Saskatchewan comes from the Viewfield pool (townships 6 to 11, ranges 6W2 to 11W2) along with a couple of smaller contributing areas along the Saskatchewan-North Dakota border near ranges 7W2 and 13W2. A very minor amount of production comes from several older (pre-2005) wells that form discrete conventional pools (>1 mD) that were drilled as vertical wells. Although the older conventional producers do not contribute nearly as much oil as the more recent Viewfield pool, they can be used as models for undiscovered prospects.

Despite the recent Bakken Formation success, new Bakken Formation oil prospects are becoming increasingly difficult to locate especially where coincident with open crown land. Taking these facts into consideration, the rocks in areas immediately west of the Roncott Platform (townships 1 to 7, ranges 26W2 to 30W2) exhibit very similar facies, oil staining and petrographic characteristics to those observed in wells producing in the Hummingbird Trough (townships 1 to 3, ranges 17W2 to 20W2) and these areas also have abundant available open crown land.

Productive wells in the Hummingbird Trough are often the result of oil trapped in discrete structures created by multiple-stage salt solution and collapse. Dissolution of the Middle Devonian Prairie Evaporite during Late Devonian and Early Mississippian time resulted in accommodation space and thickening of the Souris River, Duperow and Bakken formations. Complete dissolution of the Prairie Evaporite between the Mississippian and Cretaceous Periods caused all of the stratigraphy above the Prairie Evaporite to collapse and beds above the Souris River, Duperow and Bakken Formations to drape around the discrete structures resulting from the isolated thickening, creating multiple stacked structural oil traps.

The potential for new conventional structural targets with multi-zone opportunities west of the Roncott Platform are possible if trapping in the Hummingbird Trough is used as the model.