

Structural and Stratigraphic Controls on Hydrocarbon Accumulations in the Viking Formation, West-central Saskatchewan

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Abstract

The Viking Formation is one of the most important oil-producing reservoirs in Saskatchewan. The reservoir's relatively shallow depth and high API gravity oil, ranging from 30 to 36° (specific gravity 876 to 845 kg/m³) make it very resilient to oil price fluctuations and in turn extremely appealing to industry for development.

The distribution of the Viking Formation's oil and gas in west-central Saskatchewan, specifically between the towns of Kindersley and Kerrobert, is controlled by both structural trapping and stratigraphic pinch-out of its reservoir facies. The underlying topographic features created by the sub-Cretaceous erosional surface have significant control on Viking reservoir structural traps. The structural surface of the Viking Formation top somewhat mimics the sub-Cretaceous erosional surface, draping over its erosional highs, in particular, the structural surface of the Madison Group and its subcrop edge. The Viking mimics the sub-Cretaceous erosional surface as a result of the differential compaction of the underlying Joli Fou Formation and the Mannville Group.

Viking oil plays in the Kindersley-Kerrobert area are generally found either differentially trapped up-dip from natural gas pools along a series of successive structural or stratigraphic traps along the Viking's hydrocarbon migration pathway, or structurally below trapped natural gas.

Through the use of structural cross-sections and a series of production, structure and isopach contour maps, the nature of the Viking Formation's hydrocarbon trapping and distribution has been identified and explained.

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