

# **Facies Relationships and Hydrocarbon Potential in the Souris Valley Beds (Lodgepole Fm.) in Southeast Saskatchewan**

Erik Nickel\*

Saskatchewan Ministry of Energy and Mines, Regina, SK  
enickel@ir.gov.sk.ca

and

Donald Kent

D.M. Kent Consulting Geologist Ltd, Regina, SK, Canada

## **Summary**

The Souris Valley Beds of southeast Saskatchewan are a thick package of carbonates progressively truncated to the north by the sub-Mesozoic unconformity. Traditionally, oil exploration and production from the Souris Valley beds has been related to porosity developments at or near the unconformity, with the oil trapped against the overlying (Lower Watrous) red beds.

Due to the boom in Bakken exploration and production since 2005, numerous wells have penetrated through the Souris Valley. As a result, a better understanding can be gained of the facies relationships and potential hydrocarbon trapping in the Souris Valley. Facies analysis shows a basal transgressive unit on the Bakken, overlain by multiple south-dipping argillaceous, organic-rich clinoformal beds originating from a laterally extensive and thick sequence of clean shelf carbonate. Waulsortian mounds are also present along the eastern border of the province and in the south-central portion of Saskatchewan at the base of the clinoforms. .

Potential new hydrocarbon traps exist in the clinoformal beds as they pinch out against the central bank deposit. Waulsortian mounds and their associated facies also present an interesting exploration target. Cores in this display will show the various facies present in the Souris Valley beds, including the clinoforms, bank deposits, and waulsortian mounds.