A Late Tertiary Shift in the Stress Regime in the Williston Basin of Southeast Saskatchewan

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Gries (1983) suggested that the east-west compressive regime of the Late Cretaceous-Early Tertiary Rocky Mountain Overthrust Belt was succeeded by a north-south compression in Late Terteriary as a result of opening of the Arctic Ocean. The Williston Basin hydrocarbons had already migrated into trap position by the time of this stress transition. The change in stress regime direction resulted in a vertical fracture system which opened a conduit for water and bacteria to oxidize both the rocks and the trapped hydrocarbons. This core display will illustrate examples of alteration within Mississippian rocks hosted in 1) the Alida Formation at Fillmore, 2) the Lodgepole Formation at Ryerson, 3) the Mississippian undifferentiated at Kayville, and 4) the Devonian Bakken Formation at Montmartre.

The aerial extent of the fracturing and diagenesis associated with fresh water mixing is not known, but these cores display associated diagenetic alteration.