

Successful CO₂ Flooding in Bakken Reservoirs: Understanding the Vital Role of Geochemical and Geophysical Interactions

Peng Luo¹ and Ian M. Coulson²

¹Enhanced Oil Recovery Processes, Saskatchewan Research Council, Saskatoon, SK, Canada (luo@src.sk.ca)

²Department of Geology, University of Regina, Regina, Canada (ian.coulson@uregina.ca)

Abstract

The Upper Devonian-Lower Mississippian Bakken Formation of the Williston Basin is an important hydrocarbon reservoir. In the Canadian Province of Saskatchewan, it is estimated that Bakken Formation reservoirs are endowed with some 25 to 100 billion barrels of original oil in place. The primary recovery factor in the various Bakken Formation lithologies, however, remains rather low due to a high degree of capillary trapping. Furthermore, the rate of primary production is known to decline drastically over the first one-two years of operation. Enhanced oil recovery methods are considered key to the further development of the significant resources within Bakken reservoirs. While water flooding could result in unfavourable injectivity issues, carbon dioxide (CO₂) miscible flooding provides a promising option for significantly boosting the recovery factor.