Discovery of Sanish Field (Bakken), Williston Basin

Orion Skinner[1]

[1]Whiting Petroleum Corporation

ABSTRACT

Just over ten years ago Mountrail County, North Dakota was producing an average of 2460 BOPM of Bakken oil from a few old vertical wells and several early horizontal tests. Since that time, Bakken/Three Forks production in the county has increased to over 8.7 MMBOPM led by the discoveries of Sanish Field in April 2006 (139 MMBOE produced to date) and Parshall Field in May 2006 (128 MMBOE produced to date). The original geologic selection criteria for what is now Sanish Field were heavily influenced by the perceived key factors from Elm Coulee Field in Montana and from the 1980's vintage Upper Bakken shale horizontal play in Billings County, North Dakota. A clean GR interval with log based porosity, mature source rocks, and a partially dolomitic character of some of the thickest Middle Bakken in the basin were a few of the primary factors for Whiting's initial focused leasing effort. The thickest Upper and Lower Bakken Shale development in the Williston Basin also occurs in the field vicinity indicating the potential for higher volumes of oil generation. Larger tectonic lineaments through the area suggested the potential for discrete and significant fracture zones to target. Post discovery, extensive detailed core, log correlation and mapping efforts helped identify five facies within the Middle Bakken which influence reservoir quality and potential trapping assistance. The Three Forks became an additional unanticipated target, adding a significant number of future wells. Completion technology and methodology began a rapid evolution early in the life of the field starting with single stage stimulations and rapidly improving to multi-stage fracture stimulation of 10,000' horizontal wells, initially with 10-stages and now as high as 45-stages. The extensive and comprehensive geologic effort from SEM to regional scales has forced paradigms and concepts that contribute to the success of the Bakken Petroleum System and unconventional plays in general to continually shift and evolve as more detailed data is collected and incorporated. Many of the criteria used to identify the focus area of the original prospect area still exist, but in a much different form and weighting of importance. These learnings provide valuable insight that may be portable to other unconventional play evaluations.