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Geology and Production Characteristics of Nora CBM Field, Dickenson, Russell, Wise and Buchanan Counties, Virginia

Production of coal bed methane in Nora Field began in 1988, decades after the establishment of conventional Mississippian and Devonian production. Prior to that time geologists working the field noticed that gas shows from shallow coals were commonly higher than those from the deeper targeted sands and shales, suggesting the potential for a significant development opportunity. Early attempts to launch this play were met with skepticism due to perceptions of low initial rates of gas production, high initial rates of water production, low ultimate gas recoveries and high operating costs. The earliest wells were drilled on anticlines for added permeability and gas trap in fractures and cleats. Many of these wells exhibited two major phases of production, initially producing at high rates with steep hyperbolic decline (fracture production), then reaching the desorption phase where production decline became exponential. Single stage limited entry completions using low sand volumes and energized water evolved recently into multiple stage jobs where thick coals can be staged alone. Presently, mapping of net total seam thickness of the numerous coal seams combined with production vs. lineament trend analysis, and detailed structure mapping allow for advantageous location selection. Aggressive drilling schedules allow for the rapid development of this resource. Horizontal drilling is also being tested in some of the thicker more continuous seams in Nora field