

Comparison of Completion and Drilling Techniques Utilized in Developing Paleozoic Reservoirs in the Southern Denver Basin, Mid-Continent, Colorado USA

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Abstract

The southern Denver basin has been undergoing a resurgence in drilling for conventional reservoirs in the past five years with the discovery of the Arikaree Creek and Great Plains fields. The area initially underwent exploration for carbonaceous shales of Atokan and Cherokee age and the laterally extensive thin Cherokee Formation carbonate conventional reservoirs. Several wells were drilled including at least two laterals to test the viability of these unconventional reservoirs and thin carbonate or dolomite reservoirs. The basin is significantly under-pressured, 0.24 to 0.28 psi per foot except locally, and reservoirs are found from 5,000 to 12,000 feet. The shale reservoirs have to date proven non-productive due to low permeability and difficulties of retaining hydraulic fracture stimulations within zone. Initially conventional drill rigs were used to target all reservoirs. Subsequent drilling used state-of-the-art top drive and slim-hole technology. Despite simplicity of the geologic section with historically minimal drilling problems, several operators have experienced multiple sidetracking, lost hole and leaving several hundred feet of drill pipe in the well bore. In addition, evaluating the potential zones has been difficult in many wells. Mudlogs and mechanical logs have been misleading. DST's are seldom used. Completion methods have been relatively simple. Fracture stimulation have been attempted they have not been successful. The presentation will be discussed the caveats and pitfalls of drilling, completing and evaluating these reservoirs in an under-pressured environment.