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The characteristics and development patterns of basement reservoir: A case study of Dongping gasfield, in the Qaidam basin

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C o far, oil reservoirs account for most of the basement reservoirs which are developed. Basement gas reservoirs are relatively rare Jand most of them are developed for a short period. The Dongping gasfield of the Qaidam basin is a typical basement reservoir, which were developed in 2013. It is very meaningful to study on the development characteristics of basement gas reservoirs in depth. The thick basement rocks are usually old blocks which have endured a very long period of uplifting, exposure and weathering. There are mainly two types of reservoir spaces in basement rocks. One of them is the zone of dissolved pores and caves, which is commonly a thin zone with relatively good porosity. The other is the fracture belt, which is a relatively thick and less porous belt formed by the mechanism of tectonic movement, surface water dissolution or/and underground water dissolution. These two types of reservoir spaces make the basement rocks a typical dual-porosity reservoir. Basement reservoirs are always characterized with low porosity and relatively high permeability. The tested productivities of basement reservoirs are very high. Some wells may show open-flow capacities more than a million m3/d. The high tested productivities may be caused by high connectivity of basement reservoirs, which makes it much easier for gas to flow in a large area. Another characteristic of basement reservoir is their high single well production rate and their capacities for stable production. Their production indexes are in the range of maximum production capacity. This is depended on the controlling of producing rate and the preventing of bottom water coning. Comparing to conventional gas reservoirs, basement reservoirs show some unique features, which are their block shape, high reservoir connectivity, bottom water and high single well producing rate. Development of basement reservoirs should pay full attention to those unique characteristics. Development strategy should be based on the view of the whole reservoir and well pattern should be optimized to yield a high production rate.

Biography

Cheng Lihua is a Senior Gas Development Engineer. He has received his PhD in Petroleum Geology from China University of Petroleum in 2006. He has worked in Research Institute of Petroleum Exploration and Development. For the past 10 years, he has been engaged in the research of reservoir characterization, tight gas development, carbonate gas development, and basement rock gas development. He has published more than ten articles and one book about oil and gas development.

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