Distribution Characteristics of Oil Sandstone and Main Controlling Factors in Wangguantun Oilfield

Xiaoxu Ren[1], Jiagen Hou[1], Yuming Liu[1], and Wen Zhao[1]

[1]China University of Petroleum, Beijing, China

Abstract

Wangguantun oilfield is located in the south of Kongdian salient in Huanghua Depression, the z2 group is the major production bed. Sedimentary facies in study area is braided river of alluvial fan. It belongs to medium porosity and medium permeability reservoir. From the two aspects of sedimentary and diagenesis, we analyzed the main factors of oil sand bodies distribution. Sedimentary microfacies have an important influence on the distribution of oil sandstone. As for the braided river of alluvial fan in z2 group, 78% of oil-rich sandstones are mid-channel bar, and only 22% are braided channel. Facies controls the development of sandstones, and different kinds of sandstones have different physical properties, thereby, the differences of reservoir qualities lead to the differences of oil-bearing properties. According to the data analysis of 19 coring wells in Wangguantun oilfield, we can know that the porosity and permeability of mid-channel bar are higher than those of braided channel, thus, oil-bearing property of mid-channel bar is better than that of braided channel sandstone. Quality of the reservoir in the study area is closely related to diagenesis facies, which has apparently controlled on the distribution of the oil-rich sandstone. The diagenesis facies in study area can be divided into three types: corrosion diagenesis facies, weak cementation diagenesis facies, and compaction diagenesis facies. Reservoir of corrosion diagenesis facies is mainly distributed in the sandstone of mid-channel bar. With porosity larger than 20% and permeability larger than $100x10^{-3}$ mu;m^2, it is the best reservoir of the study area. Cementation diagenesis reservoir is mainly distributed in braided channel. Since it has a relatively high content of interstitial material, reservoir quality is poorer than that of the corrosion one, with porosity generally between 15%~20% and permeability between $50\sim100x10^{-3}$mu;m^2. In the sandstone of the edge of the channel, detrital grains are fine and the content of heterobase is high, which lead to strong compaction. With porosity smaller than 15% and permeability smaller than $50x10^{-3}m^2$, the reservoir quality is quite poor.