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Title

Hydrocarbon-charging History of Beach-bar Sandstone Reservoir of the Fourth Upper Member of Shahejie Formation in Dongying Depression

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Summary

As the further exploration and development of Dongying Depression, the beach-bar sandstone reservior of the fourth Upper member has been the new oil and gas exploration object. However, due to the complex regularity of distribution for the beach and bar sand body. The uncertainty of the main factors for the beach-bar sandstone reservoir , caused the reservoiring pattern of the beach-bar sandstone reservoir do not have the uniform standard, cannot accurately predict the distribution of the beach-bar sandstone reservoir, and so affecting the further exploration and development of the beach-bar sandstone reservoir, on the basis of the previous research papers for the fourth Upper member beach-bar sandstone reservoir of the Dongying Depression, as the analysis of fluid inclusions for the main way, Combined with sedimentary facie analysis and other methods of oil-source correlation, as the Boxing and Lijin sag to the research object, from the division of the hydrocarbon accumulation period and accumulation period to determine, to the accumulation process and the controlling factors of the accumulation, To analyze reservoir of the fourth Upper member for the Dongying Depression filling history, understand the features of the beach-bar sandstone reservoir.

Through the above research papers, and achieved some understanding of the following major:

In the geological history, the beach-bar sandstone reservoir of the fourth Upper member for the Boxing sag have 5 screen of the activities hot fluid, 4 screen oil hydrocarbon fluid filling charge of, 4 screen of the Petroleum filling, and the development of three oil and gas accumulation. The first phase is 34.8-25.7Ma, the second phase is 12.5-6.7Ma, and the third phase is 2.1-0Ma, of which the second and third period is the main period of hydrocarbon charging. In the geological history, the beach-bar sandstone reservoir of the fourth Upper member for the Lijin sag have 4 screen of the activities hot fluid, 4 screen oil hydrocarbon fluid filling charge of, 2 screen of the Petroleum filling, and the development of 3 oil and gas accumulation. Although the sag can be seen that the two have developed a three oil and gas accumulation, but accumulation in the various periods of times but there are some differences. The first and second accumulation period of Lijin sag is later, and the third reservoirs to earlier than that in the Boxing sag.

The fourth Upper member for the Dongying Depression is overpressure around 10Ma dysplasia, and continues to the present. Pressure coefficient showed three distinct cyclicity, corresponding to

the three oil and gas accumulation: The first phase of the 34.8-25.1Ma, development pressure accumulation system; the second phase of the 12.5-4.8Ma, development pressure-over-pressure system into the reservoir system; third period of 4.3-0Ma, development of excess pressure accumulation systems. Sedimentary facie study shows that the beach-bar sandstone reservior of Dongying Depression is mainly in the western, the bar sand on the beach in the Upper Chun of the fourth Upper member range mainly in the Boxing sag, and is almost no development in the Lijin sag; the bar sand on the beach in the second Chun of range widely, we could found in the both two sag. Found through research, the bar sand on the beach is mainly in the Second Chun of the fourth Upper member, little in the Upper Chun of the fourth Upper member, the beach-bar sandstone reservoir is mainly in the dam facie. Physical analysis showed that the reservoir for the fourth Upper member is the sub-holes and sub-permeability in the reservoir, the porosity ranged from 1.63-38.2%, with an average of 16.3%; penetration rate of 0.01-351mD, average 15.2mD. From the beach and bar facie could be seen, the porosity and permeability for the dam facie is slightly better than those in the beach facie. Through the oil-source correlation, the beach-bar sandstone reservoirs of the fourth Upper member in Dongying Depression have 4 types of crude oil reservoir, the Ⅰ type of crude oil looked similar from the good source rocks , the type of crude oil from source rocks of the fourth Second member, the Ⅱ type of crude oil is mixed crude oil, also has the third member and the fourth Upper member. The Ⅲ type of crude oil is similar with the source rocks on the fourth Upper member. The IV type of crude oil is similar with the source rocks on the Second Chun in the fourth Upper member. And in the Boxing and Lijin sag, there are mainly the Ⅱ and Ⅲ crude oils.

Conclusions

Above all, by the filling historical analysis of the Boxing and Lijin sag, we concluded the differences and the similar of the filling charging history for the two sags. (1)Both of the Lijin and Boxing sag have 3 filling of the oil and gas, but difference in the time of starting and finishing, and difference in the maturity;(2) The crude oil of Boxing sag is mainly the Ⅱ and Ⅲ crude oils; (3) The bar sand beach of the Boxing and Lijin sag are mostly distributed in the dam reservoir facie; (4) The bar sand beach of the Boxing sag are distributed in both the Upper and the Second member, The bar sand beach of the Lijin sag are most distributed in the Second member, and little in the Upper member.

Theory and/or Method(key words)

Fluid Inclusions, Fluorescent Spectroscopy, Hydrocarbon Accumulation Process

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