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Characteristics of hydrocarbon accumulation and distribution of tight oil in China: an example of Jurassic tight oil in Sichuan basin

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Tight oil is well developed and widely distributed in China. Taking Jurassic of Sichuan basin as an example, it is found that Jurassic in Sichuan basin shares the similar hydrocarbon accumulation conditions and reservoirs characteristics with Eagle ford and Bakken tight oil, and it is possible to borrow the ideas of tight oil exploration and development methods from abroad.
It used to believe that the Jurassic was a fractured reservoir, characterized by a gentle structure, disseminated hydrocarbon and low aggregation. Its average permeability is below 0.5mD; the porosity is 0.1∼5.9%; the proved reserves abundance is 4.41×105bbl/km2. Considered as a fractured-structural reservoir, it was explored under the principles of drilling on highland, aiming at fractures. However, the latest research shows that the reservoirs satisfy the requirements of tight oil.
The Jurassic are sets of lacustrine, floodplain and fluvial-delta deposition, which could be divided into 3 formations, namely Ziliujing Formation, Lianggaoshan Formation and Shaximiao Formation in ascending order. Ziliujing Formation consists of interbedded lacustrine shale and shelly limestone which could reserve tight oil or shale oil. Lianggaoshan Formation and Shaximiao Formation are composed of floodplain and fluvial-delta deposited grey sandstone and shale. The reservoirs develop fracture-porosity duel system, both of which contain oil.
2 sets of excellent source rocks are developed in Lianggaoshan Formation and Daanzhai Member. The distribution area and hydrocarbon generation potential are quite inspiring. Within oil source play and near source play are developed. The close relationship between source rocks and reservoirs provides a great advantage to form continuous oil reservoirs.
There is no obvious corresponding relationship between hydrocarbon distribution and structure in the area. Oil can be found in anticline, slope and syncline. Traps boundaries are not distinct. Nearly all the reservoirs lack edge or bottom water, and have geologic characteristics of continuous tight oil, which are large scale, continuous, integrated and diffusive distributed. These provide necessary conditions of forming a large scale of continuous tight oil.
In short, Jurassic in Sichuan basin shares the similar hydrocarbon accumulation conditions and reservoirs characteristics with typical tight oil. In other words, oil of Jurassic in Sichuan basin is the tight oil.