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The research of transformation of water-flooding development model in super-low permeability oil reservoirs

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Statement of the Problem: It is very difficult to build effective displacement system for super-low permeability oil reservoirs through general fracturing and water injection, resulting in low oil production of single well, high ratio of ineffective water-flooding, low economic performance and so on. All of these show that the traditional water-flooding development model cannot fit economical and effective development of super-low permeability oil reservoirs.

Methodology & Theoretical Orientation: According to the imbibition recovery mechanism, it is figured out that imbibition oil recovery rate has increased dramatically in magnitude after network fracturing in super-low permeability oil reservoirs; therefore, imbibition oil recovery has changed from the subordinate effect into the dominant one in super-low permeability oil reservoirs. Furthermore, by summing up the practice of many oil fields, some imbibition development models are proposed, such as water-flood huff and puff, asynchronous injection and production, exchanging between production wells and injection wells.

Findings: A brand new comprehensive development model network fracturing and imbibition oil recovery is being created, this model is already applied in some oil fields in china and the effect of preliminary implementation is remarkable. It is estimated that the final recovery efficiency of the reservoirs can be increased by over 10%.

Conclusion & Significance: The new development model holds important popularization and application foreground and will take more and more important effects on low permeability oil reservoir development.

Recent Publications

- Wu Zhongbao, Zeng Qian and Li Jin (2017) New effective energy-supplement development method of water-flood huff and puff for the oil reservoir with stimulated reservoir volume fracturing. *Petroleum Geology and Recovery Efficiency*; 24: 78-83.

References

- Chen Zhiming, Liao Xinwei and Zhao Xiaoliang (2015) Productivity model of oil/gas productivity of vertical wells in simulated reservoir volume. *Petroleum Geology and Recovery Efficiency*; 22: 121-126.
- Wang Jialu, Liu Yuzhang and Chen Maoqian (2009) Experimental study on dynamic imbibition mechanism of low permeability reservoirs. *Petroleum Exploration and Development*; 36: 86-90.

Biography

Wu Zhongbao a Senior Engineer has completed his Graduation from China University of Petroleum (Hua Dong) in 1993. He had worked in Jiangsu Oilfield for 10 years. He had done his Doctoral degree in 2007 and Post-Doctoral in Mobile Station of Research Institute of Exploration and Development of Petro-China (RIPED). He has worked in Haita Research Center of RIPED in 2009 and worked in simulation and software center in 2017.

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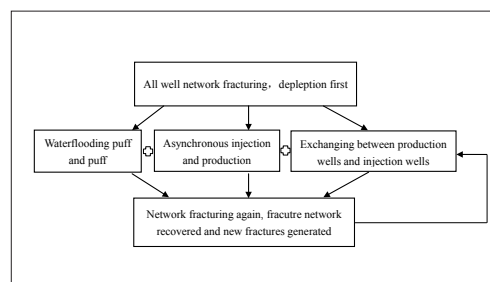


Figure-1: New development model multi-network re-fracturing and water-flood huff and puff imbibition.