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Comprehensive Geologic and Physical Reservoir Characteristics and Geological-Field Data Analysis for Selection of Reservoirs for Injectivity Profile Leveling

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Flow diverting technologies are now becoming the important element of the oilfield development system with waterflooding, which allows to improve long-term reserve potential, cut down produced water withdrawals and increase the heterogeneous reservoirs coverage by waterflooding.

A large amount of work is done for injectivity profile leveling at the fields of Western Siberia (Nizhnevartovskiy district). The production formations are divided into three groups of layers: A, B and U, which differ greatly in permeability: A - av. permeability is 92 mD, B - av. permeability - 582 mD and U - average permeability - 22 mD. 764 wells operations have been completed at 17 fields over the past three years. The efficiency rate is 92% with an average effect duration of 300 days. Four main groups of injectivity profile leveling (IPL) technologies are distinguished: gel-forming systems (GFS); visco-elastic compounds (VEC); polymer-dispersed systems (PDS) and precipitate-forming systems (PFS).

A two-stage system of reservoir ranking has been prepared to estimate the applicability of injectivity profile leveling methods. The methodology uses parameters that have a significant effect on method's efficiency.

At the first stage, the field (reservoir) development status is determined and the general rank is assigned according to the following indicators:
- The ratio of the number of producing and injection wells;
- The ratio of total output of oil from initial recoverable reserves of oil (%) / watercut;
- Residual recoverable reserves of oil per 1 well;
- Ratio of water-oil ratio (WOR) to total output of oil.

At the second stage, the objects are ranked according to the geologic and physical reservoir characteristics (GPC) in a similar scheme of the first stage, and the general rank of the GPC is assigned. The weight coefficients of reservoir characteristics are expertly determined by the statistics methods.

The reservoirs on which there has not yet been applied injectivity profile leveling technologies are analyzed through a two-stage ranking system. The priority reservoirs are suggested for the works for leveling of injectivity profile of injection wells for the purpose of regulation technology water flood recovery.

Biography:

Elena Baikova is Deputy Director of the Center of reservoir modeling and reservoir and production engineering in Krylov All-Russian Oil and Gas Scientific Research Institute (VNIIneft JSC), Moscow, Russia. Elena Baykova worked in West Siberia more than 30 years, has extensive experience in the development of oil and oil-and-gas fields. Her main scientific interest is focused in EOR. Author of 20 scientific articles PhD of geology and oil field development.

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