

Well Strategies for Enhanced Tight Oil Recovery

Research Themes

Waterflooding is the most economical and widely used enhanced oil recovery approach. So far, the attempts to implement waterflood in tight oil reservoirs were not very successful, and many operators do not see it as a technically and economically viable option. Multiple transverse fracture horizontal wells (MTFHW) have proven to be very successful for primary development of tight oil reservoirs. This research investigated more favorable MTFHW patterns designed from the beginning for secondary oil recovery. The key to the success of any displacement process is assuring no connection exists between hydraulic fractures in injection and production wells. Well patterns likely to succeed feature positioning injector hydraulic fractures between the hydraulic fractures of producer hydraulic fractures. Such a pattern results in many simultaneous planar displacements.

Recent Accomplishments

Analytical modeling was used to evaluate wells specifically designed to benefit from plane-to-plane waterflooding. Based on that we have developed a screening algorithm that enables quick evaluation of any given formation as a prospect for waterflooding and that proposes an optimum well and pattern design strategy for implementing waterflood in a tight oil formation.

Issues

Water is not the only displacement fluid of interest. Carbon dioxide or currently flared methane are other potential fluids to consider, especially in formations like Eagle Ford where many of the most successful oil wells produce gas condensate from the formation instead of liquid oil.

Secondary fractures may be created during the hydraulic fracture treatments that could short circuit the displacement process.

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