COMPLEX HOT WATER FLOODING TECHNOLOGY WITH PERIODIC PRODUCTION

Background
Combining different technologies a synergetic effect could be obtained. For the development of high viscous oils the thermal treatment technology combined with the non-stationary water flooding could be used. The main issue is to combine positive effects in order to gain the maximum oil recovery.

Aims and Objectives
To establish the limits for thermal treatment and non-stationary water flooding used as a complex in order to gain the maximum positive effect of both technologies and thus to increase the oil recovery.

Methods
Hydrodynamic modelling.

Results
1. The efficiency of thermal treatment raises slowly due to low thermal impact of the technology to the productive stratum, therefore it is necessary to inject a lot of hot water in order to gain the designed effect. However, when the reservoir becomes hot the efficiency of thermal treatment rises significantly and lasts for a long period of time. On the opposite, the non-stationary water flooding has the high efficiency, which decreases over the time.

2. It is obvious that combining these technologies the synergetic effect could be obtained, when the cumulative effect of hot water non-stationary flooding is bigger than a sum of two separate effects. The efficiency of thermal treatment is better when the water stays in the productive stratum for a long period of time, for example in the case of periodic production from the production wells in the opposite phase with injection. As per mathematical modelling this technology would increase the oil production rate.

3. If this technology is used for isothermal conditions (without heat treatment) then the oil production rate increases in 3...4 times relatively to the basic development plan, which compensates the idle time of production wells. Moreover, if this technology is used as a complex with non-stationary water flooding and thermal treatment, the oil production rate increases in 4...5 times, as per synergetic effect.

Key words: a reservoir, permeability, oil production rate, non-stationary water flooding, thermal treatment, watercut

References


The authors

- Vladimirov Igor V., Doctor of Technical Sciences, Professor
  Konkord ZAO
  Deputy General Director,
  Director of Development of Oil and Gas Fields Department
  10, stroeniye 3, Dmitrovskiy proyezd, Moscow, 127422, Russian Federation
tel: (495) 748-41-35
e-mail: igorv@ufamail.ru

- Veliev Elshad M.
  Institute of Energy Resources Transportation GUP
  1st Category Engineer of Corrosion Monitoring and Anti-Corrosive and
  Bioprotective Chemical Treatment Department
  144/3, October ave., Ufa, 450055, Russian Federation
tel: (347) 284-36-47
e-mail: _elshad_@mail.ru
  Post-graduate Student of Institute of Energy Resources Transportation GUP
  (Correspondence Form of Education)

- Almukhametova Elvira M., Candidate of Technical Sciences
  Oktyabrskiy Affiliate of Ufa State Petroleum Technological University
  Assistant Professor of Exploration and Exploitation of Oil
  and Gas Fields Chair
  54 a, Devonskaya str., Oktyabrskiy, Republic of Bashkortostan,
  452607, Russian Federation
tel: (34767) 6-60-30
fax: (34767) 6-64-04
e-mail: elikaza@mail.ru