

The influences of ultrasound waves on rheological and physico-chemical properties of extra heavy oil from “Ashalcha” field

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Abstract

© SGEM 2017. All Rights Reserved. Extra-heavy oil is considered as one of alternative energy sources mainly because of reserve potentials, rich in organic compounds and rare transition metals like V and Ni. Extraction from this hydrocarbon resource has always been a challenge due to high oil viscosity and as a result low mobility within porous media. Conventionally the production from extra-heavy oil reservoirs is achieved by thermal methods such as SAGD, CSS, Insitu combustion, etc. However, these techniques do not consider the post productions' physical and chemical crude oil properties particularly its refinery values. Moreover, these methods are mainly restricted with onshore fields where there is enough working area exists. In addition, application of thermal methods are not reasonable for shallow and thin reservoirs primarily due to inoculation issues. This research study aims to introduce an alternative approach to thermal methods. In this approach, an ultrasound wave technology is used to enhance physico-chemical properties of extra-heavy oil. To examine the effectiveness of proposed technique a fluid sample from “Ashalcha” field is used. Initially, ultrasonic wave parameters like frequency, amplitude and wave generation time are optimized. The determined optimum wave parameters are then utilized to investigate the change in physico-chemical properties of fluid sample after ultrasound treatment. The results of study show that application of ultrasonic wave technology is able to reduce viscosity and improve the refinery values of extra-heavy oil from “Achalcha” field.

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Keywords

Extra-heavy oil, Physico-chemical improvement, Ultrasound treatment, Viscosity reduction

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