

Accepted Manuscript

The challenges of waxy oil production in a Russian oil field and laboratory investigations

I.A. Struchkov, M.K. Rogachev



PII: S0920-4105(17)31045-8

DOI: [10.1016/j.petrol.2017.12.082](https://doi.org/10.1016/j.petrol.2017.12.082)

Reference: PETROL 4572

To appear in: *Journal of Petroleum Science and Engineering*

Received Date: 10 April 2017

Revised Date: 23 December 2017

Accepted Date: 28 December 2017

Please cite this article as: Struchkov, I.A., Rogachev, M.K., The challenges of waxy oil production in a Russian oil field and laboratory investigations, *Journal of Petroleum Science and Engineering* (2018), doi: 10.1016/j.petrol.2017.12.082.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

THE CHALLENGES OF WAXY OIL PRODUCTION IN A RUSSIAN OIL FIELD AND LABORATORY INVESTIGATIONS

Struchkov I.A.¹, Rogachev M.K.¹

¹Saint-Petersburg Mining University, Saint Petersburg, Russian Federation

Corresponding author. I.A. Struchkov is to be contacted at Tel.: +7-911-283-2674. Struchkov I.A., PhD of a “Development and exploitation of oil and gas fields” Department, Saint-Petersburg Mining University, Saint Petersburg, Russian Federation. Address: 21st Line, St Petersburg 199106, Russian Federation.

E-mail addresses: StruchkovIA@gmail.com (I.A. Struchkov)

Abstract: The objective of this paper is selection the appropriate well operation conditions and effective wax inhibitor to reduce impact of wax in oil on production. The field operation is complicated with formation of wax deposits in flowlines and tubings due to high wax concentration in oil and improper wells operation. Expensive selection of effective wax inhibitor is regularly carried out in the field.

The methodology of research used in this paper basically includes theoretical and experimental approaches. Theoretical approach is devoted to studying the thermodynamic functions of state of the system during wax crystallization in oil. This approach allows to explain behavior of wax in oil during crystallization. The authors of this paper calculated thermodynamic state functions of the system during wax precipitation in hydrocarbon solution and in reservoir oil to describe the process of wax crystallization and to explain change of apparent WAT with change of the well operation conditions and dosing of wax inhibitor. Calculations of thermodynamic state functions for model hydrocarbon solutions were carried out for pressure, ranging from 0.1 to 40 MPa, and for wax concentration in solution, ranging from 10 to 60%. Experimental approach was based on studying wax precipitation in reservoir oil by visual method using microscope under high pressure. The study was performed in the pressure range from 5.6 to 18.4 MPa, and wax concentration of 24%. Experimental data of wax precipitation in kerosene and in oil was processed using Vant Hoff's diagrams, Gibbs free energy equation during chemical reaction, and first and second laws of thermodynamic equations.

The main result of this paper is examination of impact external factors on wax crystallization in oil, which will assist to select the well operation conditions in the presence of parafinization. Particularly, it was determined that with increase in pressure, apparent wax appearance temperature (WAT) is increasing, however, wax crystallization rate is declining. Additional research showed that apparent WAT is decreasing when oil cooling rate and

Download English Version:

<https://daneshyari.com/en/article/8125263>

Download Persian Version:

<https://daneshyari.com/article/8125263>

[Daneshyari.com](https://daneshyari.com)