

ABSTRACT

In Oil industry there are three stages for extract Oil from the reservoir, primary, secondary and tertiary period. Since this last period in the history of the field commences with the introduction of chemical and thermal energy to enhance the production of oil, it has been labeled as enhanced oil recovery (EOR), therefore presents a host questions, decisions, designs and responsibility to select the best technology for a given situation and to solve the myriad of problem that arise in actual practice. The purpose of this thesis is to select the best EOR method for a Sudanese reservoir BM, BS and BW and to predict future Oil production performance of the field using Analytical methods since, it is much faster to obtain results from Analytical models than from simulation. Analytical models are still useful tools for preliminary forecasting purposes and sensitivity studies. In addition to, the models provide a better insight than Simulation into the physics of the thermal process.

In our study we use Screening Criteria for Application of selected EOR methods to select the best EOR method for BM,BS and BW. Reservoir properties and parameters were applied to screen the reservoirs and to predict the production performance. Reservoir properties where applied with (10°-21°API), (900-1752 cp) viscosity and (1400-1750psi) pressure. In our study, we predict the production performance of a 5-spot steamflood pattern unit, comparative model, area 10 ac, injection rate 600 BBL/D and injection pressure 1300 psi for B1A, B1B and B1C in BM field using new Analytical Model and compared the results against the base Case using OFM forecasting tool.

Frequently displacement is assumed to be piston-like. This means that there is a sharp drop in the oil saturation across the displacement front, leaving a uniformly low amount of oil in the swept zone. In our entire model, certain simplifying assumptions have to be made to solve the complex heat and fluid flow equations. In the analytical methods, the reservoir is typically assumed to be homogenous.

To apply analytical Model excel sheet has been used to execute the equations. The result of the study come out with Steam flooding as the best EOR candidate for BM,BS and BW field and difference in average Oil production rate for 13 years comparing the steam flooding with the Base Case as follows: B1A 326 stb/d, B1B 360 stb/d and B1C 434 stb/d and the percentage increase as follows: B1A 72(%), B1B 68(%) and B1C 56(%).the increase percentage is high due to simplifying assumptions have been made to solve the complex heat and fluid flow equations like Frequently displacement is assumed to be piston-like and the reservoir is typically assumed to be homogenous.