conferenceseries.com

World Congress on

Petroleum and Refinery

July 21-22, 2016   Brisbane, Australia

A numerical study of temperature profile by coupling memory-based diffusivity model with energy balance during thermal flooding

Amjed M Hassan and **M Enamul Hossain**
King Fahd University of Petroleum & Minerals, Saudi Arabia

Accurate estimation of the temperature distribution within a reservoir undergoing a thermal recovery operation is a key factor in process design, reservoir management and production forecasting. The thermal and rheological properties of the reservoir rock and fluids play significant roles in the heat transfer between the formation matrix and flowing fluids. The memory-based diffusivity equation is implemented as a momentum-balance to present continuous alteration of rock and fluid properties and to investigate the temperature propagation during thermal flooding process. This model is coupled with recently developed energy balance equation to investigate the different parameters that influence the temperature profile. Numerical solution of the coupled mathematical model is presented for the case of equal rock and fluid temperature. It is assumed that the rock attains the fluid temperature instantaneously, that is, the rock and fluid temperatures are assumed equal throughout the reservoir. Matlab 7.10 program is used to carry out the computation and provides temperature profiles. Results show that, coupling the memory-based diffusivity model with energy balance leads to more reasonable temperature profiles during the thermal flooding. The distribution of reservoir temperature with respect to time and distance can be estimated by coupling the memory-based equation and the mathematical tool which were developed by Hossain et al., in addition, it can be concluded that, the fluid velocity, time and the rheological properties, have important effects on the temperature distributions throughout the reservoir. In future, the results of the numerical solution can be integrated with lab experiment results to predict performance of thermal flooding process and better understanding of reservoir management.

Biography

Ajmed M Hassan is a PhD student at King Fahd University of Petroleum & Minerals (KFUPM), Department of Petroleum Engineering, Saudi Arabia. He earned his MSc in Petroleum Engineering from KFUPM. He is working at University of Khartoum and PetroEDGE Company, Sudan. He has authored and co-authored several scientific articles in area of reservoir simulation, numerical analysis and thermal oil recovery processes. He has received two awards from Schlumberger Company for the best academic performance in petroleum engineering and for the best graduation project.

amjed.moh06@gmail.com

Notes:

J Pet Environ Biotechnol
ISSN: 2157-7463 JPEB, an open access journal

Petroleum 2016
July 21-22, 2016

Volume 7, Issue 3 (Suppl)

Page 30