
Simulation of Waterflooding in an Offshore Oil Reservoir in Order to Improve the Recovery Factor

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Abstract It has been a long time that oil reservoirs in Iran have been producing with the natural pressure and now because of decline in reservoir pressure, EOR methods have to be done for increasing the pressure and recovery. Water Flooding is one of the conventional and economic EOR methods that are appropriate for offshore reservoirs in Iran. It is cost-effective and usual in offshore reservoirs for these reasons : • Water is enormously available in Iran offshore reservoirs. • Water is an effective displacing fluid for oil and usually has a high recovery factor. • Water Injection is not a costly process and it doesn't require an advanced technology. • Water Injection problems are low, as well it's pollution is not considerable compared to the other processes. • Water diffuses all over the oil formation easily. In this paper, factors affecting water flooding to be successful are considered. These factors are : • Reservoir geometry • Fluid properties • Reservoir depth • Primary drive mechanism • Fluid saturations • Reservoir heterogeneity • Lithology and reservoir rock properties • Water flooding pattern (location and number of production/injection wells, production/injection rate and horizontal/vertical wells) Water injection in a stratified reservoir may come not to be successful. Permeability in some producing zones is variable horizontally and vertically. In some zones with different permeabilities that are connected horizontally together, displacing water sweeps the oil in the more permeable layers more quickly and so a large amount of oil remaining in the less permeable layers should be recovered in an extended time by injecting a huge amount of water. Recovery parameters such as recovery factor, water cut, GOR and so on are investigated in the stratified reservoirs in both natural depletion and water injection scenario as the results of the project.
