

ABSTRACT

TIME-LAPSE MICROGRAVITY METHOD TO MONITORING FLUID DYNAMICS AT RESERVOIR FIELD “TFQ”, SOUTH SUMATERA BASIN

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Time-lapse microgravity method is a development of 3D gravity technique (x, y, z) with his fourth dimension is time (t). The principle of this method is to measure gravity repeated either daily, weekly, monthly or yearly by using a gravimeter with accuracy readings in microGall. In this study, time-lapse microgravity method will be used to monitor the fluids movement, water saturation changes, pressure changes, and density changes in reservoir due to the Enhanced Oil Recovery (EOR) process. EOR is the process of injecting water into the reservoir to drain the remnants of oil in the pores of the reservoir rock. By using secondary data of time-lapse microgravity anomaly and case study in field "TFQ", South Sumatra Basin in period from January to May, May to September, and January to September 2003, obtained density changes in reservoir with value -0.02 to -0.05 gr/cm³. Water saturation changes in the reservoir increased with value 20 to 40% with a 15% effective porosity, and pressure changes with value -100 to -200 Psi in period from January to September. Negative density changes in the reservoir area allegedly due to the injection of water that has not been effective in filling the void of mass and push the oil to the production wells due to obstructed two major faults that are sealing fault, so that the direction of fluids movement moved from northeast to southwest. From the analysis of fluids dynamics changes in the reservoir with parameters density changes, water saturation changes, and direction of fluids movement derived from time-lapse microgravity data indicated the time-lapse microgravity method can be used for reservoir monitoring in EOR activities.

Keyword : time-lapse microgravity, EOR, monitoring