INTISARI

MONITORING PENYEBARAN FLUIDA AKIBAT INJEKSI DAN PRODUKSI PADA LAPANGAN HIDROKARBON ILFAH MENGGUNAKAN *TIME-LAPSE* MIKROGRAVITASI

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Volume produksi dapat ditingkatkan melalui pemeliharaan tekanan dengan injeksi air (*waterflood*) dan *monitoring* penyebaran fluida akibat proses injeksi dan produksi yang efektif dilakukan menggunakan metode *time-lapse* mikrogravitasi.

Penelitian *time-lapse* mikrogravitasi telah dilakukan di lapangan hidrokarbon Ilfah, Kabupaten Bekasi, Jawa Barat. Pengukuran dilakukan pada September hingga Desember 2004 dan 2006. Anomali *time-lapse* mikrogravitasi didapatkan melalui pengurangan gravitasi observasi pada 2006 dan 2004 serta dikoreksikan terhadap penurunan tanah dan penurunan muka air tanah. Anomali *time-lapse* mikrogravitasi dan data sumur injeksi-produksi menjadi dasar dalam analisis penyebaran fluida, didukung dengan perubahan fisika batuan lainya seperti perubahan densitas, perubahan *apparent* saturasi, perubahan *apparent* tekanan, serta analisis model bawah permukan.

Berdasarkan analisis-analisis tersebut diketahui bahwa lapangan Ilfah didominasi anomali negatif (-0,05 hingga -0,25 mGal) pada zona utara dan zona selatan yang sebanding pengurangan densitas (-0,02 hingga -0,08 g/cc) akibat proses produksi yang lebih dominan. Hal tersebut dikonfirmasi melalui pemodelan bahwa pada zona produksi utara dan selatan memiliki kontras densitas negatif yaitu sebesar -0,165 g/cc dan -0,175 g/cc Melalui model geologi yang didapatkan melalui *forward modeling* dan data volume produksi, disimpulkan bahwa pada zona selatan injeksi efektif ke arah sumur PROD-01A dan di zona utara injeksi efektif ke arah sumur PROD-03A. Injeksi pada lapangan Ilfah diinterpretasikan kurang efektif, yaitu dilihat dari adanya perbedaan volume produksi yang signifikan dari beberapa sumur. Oleh sebab itu, diperlukan adanya pengembangan sumur injeksi baru di daerah utara dan selatan di lapangan Ilfah.

Kata kunci : *Time-lapse* mikrogravitasi, penyebaran fluida, densitas, produksi, injeksi

ABSTRACT

FLUID DISTRIBUTION MONITORING DUE TO THE INJECTION AND PRODUCTION IN ILFAH HYDROCARBON FIELD USING TIME-LAPSE MIKROGRAVITASI

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Production volume can be increased through pressure maintenance by waterflood technique and monitoring of fluid distribution due to the injection and production process using time-lapse microgravity method.

Time-lapse microgravity research had been conducted out in the Ilfah hydrocarbon field, Bekasi Regency, West Java. Measurements were carried out from September to December 2004 and 2006. Time-lapse microgravity anomalies were obtained through reduced gravity observations in 2006 and 2004 and corrected by subsidence and groundwater lowering.

Time-lapse microgravity anomalies and injection-production well data became the basis for fluid distribution analysis, supported by other rock physical changes such as density changes, apparent saturation changes, apparent pressure changes, and geological subsurface analysis.

Based on these analyzes it is known that the Ilfah field is dominated by negative anomalies (-0.05 to -0.25 mGal) in the northern zone and the southern zone which is proportional to the reduction in density (-0.02 to -0.08 g / cc) due to dominant production process. This was confirmed through modeling that the northern and southern production zones have a negative density change of -0.165 g / cc and -0.175 g / cc. Through the geological model was obtained by forward modeling and production volume data, it was concluded that in the southern zone the injection was effective towards the PROD-01A well and in the northern zone the injection is effective towards the PROD-03A well. Injection on the Ilfah field was interpreted to be less effective, which is seen from the significant difference in production volumes from several wells. Therefore, it is necessary to develop new injection wells in the north and south areas of the Ilfah field.

Keywords: Time-lapse microgravity, fluid distribution, density, production, injection