ANALISIS SELISIH-ATRIBUT SEISMIK KOMPLEKS PADA PENGOLAHAN DATA SEISMIK 4D UNTUK *STEAMFLOOD MONITORING* DI AREA `TB-1878` PT. CALTEX PACIFIC INDONESIA

INTISARI

Analisis Seismik 4D telah dilakukan pada data Monitor 1 (Repro), Monitor 1 dan Monitor 2, yakni data Seismik 3D area `TB-1878` setelah 8 dan 16 bulan dilakukan *steamflooding*, dengan cara menentukan selisih-waktu, selisih-fase dan selisih-amplitudo masing-masing data tersebut terhadap Baseline, yakni data Seismik 3D area `TB-1878` sebelum dilakukannya *steamflooding*. Dengan dibantu *software* Promax Chevronized 4D, analisis Seismik 4D ini bertujuan memantau perkembangan lateral *steamflood* berdasarkan anomali atribut seismik yang diakibatkannya.

Metode *crosscorrelation* dan penghitungan selisih-akar purata *reflection strength* diterapkan pada dua *interval window* masing-masing data yakni *reference window*, yang ditentukan pada formasi batuan-batuan non-reservoar non-target *steamflooding*, dan *target window*, yang ditentukan di formasi batuan reservoar target *steamflooding*. Hasil analisis pada *reference window* dijadikan koreksi bagi *target window* untuk meminimalkan faktor penyebab anomali atribut non-*steamflood*.

Dari hasil analisis Seismik 4D, ditunjukkan bahwa pada *reference window*, selisih-waktu, selisih-fase dan selisih-amplitudo tidak menampakkan anomali di zona injeksi *steamflood* namun ditemukan koreksi yang cukup luas pada Monitor 1 (Repro) – Baseline. Pada *target window*, masing-masing selisih-atribut menunjukkan anomali yang signifikan di zona injeksi *steamflood*. Selisih-fase memperlihatkan anomali yang lebih optimal dibandingkan selisih-waktu, tetapi selisih-amplitudo memperlihatkan anomali yang paling optimal di antara ketiga selisih-atribut itu. Berdasarkan perkembangan pola anomali yang dapat dikorelasikan dengan perkembangan sapuan lateral *steamflood*, didapatkan rerata kecepatan ekspansi lateral sumur injeksi *steamflood* sebesar 4,30 meter/bulan. Dengan demikian diperoleh perkembangan yang positif yaitu makin lama durasi *steamflooding* maka makin luas zona yang akan tersapu oleh *steamflood*.

ANALYSIS OF COMPLEX SEISMIC ATTRIBUTTE-DIFFERENCE IN 4D SEISMIC DATA PROCESSING FOR STEAMFLOOD MONITORING AT 'TB-1878' AREA OF PT. CALTEX PACIFIC INDONESIA

ABSTRACT

4D Seismic analysis has been conducted to Monitor 1 (Repro), Monitor 1, and Monitor 2 data, which are the 3D Seismic data of 'TB-1878' area after 8 and 16 months been steam-flooded continuously, by determining the time-difference, phase-difference, and amplitude-difference of each data versus Baseline, which is a 3D Seismic data of 'TB-1878' area before steamflooding. By the support of Promax Chevronized 4D software, the 4D Seismic analysis has the purpose to monitor the lateral expansion based on the seismic attribute anomaly that was resulted in.

The cross-correlation method and the calculation of root mean square-difference of reflection strength was computed into two interval windows of each data that is the reference window, which was picked at non-reservoir rocks formation as the non-steam-flooded formation, and the target window, which was picked at reservoir rocks formation as the steam-flooded formation. The analysis result at the reference window become the correction for the target window to minimize the attribute anomaly caused by non-steamflood factor.

From the 4D Seismic analysis result, it was showed that in the reference window, the time-difference, the phase-difference, and the amplitude-difference didn't exhibit anomaly at the steamflood injection zone but some large corrections exist in Monitor 1 (Repro)-Baseline. In the target window, each attribute-difference exhibits significance anomaly at the steamflood injection zone. The phase-difference displays more optimum anomaly rather than the time-difference but the amplitude-difference displays the most optimum among those three attribute-differences. Based on the anomaly pattern development that can be correlated with the steamflood lateral swept, the averaged lateral expansion rate was obtained of 4,30 metres/month. Hence, a positive development was obtained that is the longer duration of the steamflooding the wider the zone that would had been swept by the steamflood.