

INTISARI

INTEGRASI INVERSI IMPEDANSI ELASTIK DAN NEURAL NETWORK UNTUK MENGIDENTIFIKASI ZONA PROSPEK HIDROKARBON PADA RESERVOIR KARBONAT DI LAPANGAN “WESTEROS”, SUB CEKUNGAN JAMBI

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Metode inversi impedansi akustik (AI) tidak selalu dapat mengkarakterisasikan reservoir hidrokarbon. Hal tersebut dikarenakan terdapat nilai AI yang sama antara zona target dan zona non-target, sehingga memunculkan ambiguitas dalam proses interpretasi hasil inversi. Oleh karena itu, metode inversi impedansi elastik (EI) dilakukan untuk mengatasi kekurangan tersebut. Aplikasi *neural network* pada hasil inversi dapat dilakukan untuk menghasilkan properti fisik bumi yang dibutuhkan sebagai penunjang interpretasi. Pada penelitian ini, penerapan metode inversi EI yang diintegrasikan dengan *neural network* dilakukan pada reservoir karbonat Formasi Baturaja di lapangan “Westeros”. Inversi EI dilakukan pada volume *near-angle stack* (EI *near*) dan *far-angle stack* (EI *far*). Hasil inversi tersebut diintegrasikan dengan *neural network* untuk memprediksi *pseudo-volume* log porositas efektif. Dari penelitian ini didapatkan nilai EI *near* sebesar 18000 – 30000 (ft/s)*(g/cc), EI *far* sebesar 2400 – 30000 (ft/s)*(g/cc), dan *pseudo-volume* log porositas efektif sebesar 8% - 20%. Dari hasil inversi dan *neural network* tersebut, EI *near* mampu mengkarakterisasikan reservoir karbonat dengan memisahkan antara litologi karbonat *porous* dan karbonat kompak, sedangkan hasil inversi EI *far* mampu untuk mendeteksi keberadaan fluida gas yang didukung oleh hasil *pseudo-volume* log porositas efektif. Sehingga, zona prospek hidrokarbon dapat ditentukan untuk rekomendasi sumur pengembangan terletak di sebelah timur area RVN dan sumur eksplorasi terletak di barat laut area RVN, barat area DGS, dan selatan area DGS.

Kata kunci: inversi impedansi elastik, *neural network*, *pseudo-volume* log porositas efektif

ABSTRACT

INTEGRATED ELASTIC IMPEDANCE INVERSION AND NEURAL NETWORK TO IDENTIFY HYDROCARBON PROSPECT ZONE OF CARBONATE RESERVOIR IN "WESTEROS" FIELD, JAMBI SUB BASIN

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Acoustic impedance (AI) inversion method could not characterize hydrocarbon reservoir. Because there is an overlap value of AI between the target zone and the non-target zone. This overlap value increases the ambiguity of inversion result interpretation. To solve this problem, elastic impedance (EI) inversion method is performed to overcome the weakness. Neural network applications on the inversion results can be done to generate the earth's physical properties that needed for interpretation support. In this study, EI inversion method with neural network was applied on the carbonate reservoir of Baturaja Formation in the "Westeros" field. EI inversion was performed on near-angle stack and far-angle stack volume. The result of the inversion was integrated with neural network to predict pseudo-log volume of effective porosity. In this study, carbonate reservoir is characterized by the interval of EI near at 18000 - 30000 (ft/s)*(g/cc), EI far at 2400 - 3000 (ft/s)*(g/cc), and effective porosity at 8% - 20%. Based on that result, EI near inversion is able to characterize carbonate reservoir by successfully separating porous carbonate with tight carbonate. Additionally, the result of EI far is able for detecting the presence of gas which is supported by the result of pseudo-log volume of effective porosity. So that, the hydrocarbon prospect zone can be determined for development well recommendation, which is located in the east side of RVN area and for exploration wells recommendation, which is located in the north-west side of RVN area, west and south side of DGS area.

Keywords: elastic impedance (EI) inversion, neural network, pseudo log volume effective porosity