Prediksi distribusi saturasi air (SW) berdasarkan integrasi data log resistivitas dan data produksi (studi kasus lapangan Shinta, Cekungan Kutai) = Distribution prediction of water saturation (SW) based on the integration of resistivity log and production data Shinta field Kutai basin

Lukman Denny Andika, author

Abstrak

[Identifikasi hidrokarbon merupakan salah satu tujuan utama dalam
eksplorasi lapangan minyak bumi, dan perkiraan nilai saturasi merupakan salah satu bagian penting dari identifikasi hidrokarbon. Dalam penentuan perkiraan saturasi tersebut, atribut seismik dapat digunakan baik secara numerik maupun analitik. Meskipun hubungan antara atribut seismik dengan karakteristik batuan reservoar tidak dapat didefinisikan secara explisit, namun penggunaan atribut seismik ini dapat membantu dalam proses karakterisasi reservoar. Proses prediksi nilai saturasi air pada Lapangan Shinta dilakukan dengan
menggunakan transformasi log resistivitas berdasarkan persamaan Archi, dimana faktor sementasi diasumsikan sebesar 0.62, dengan eksponen sementasi yaitu - 2.15 serta faktor resistivitas air yaitu 0.04. Selanjutnya nilai saturasi air transform tersebut dijadikan sebagai target untuk penyebaran nilai saturasi fluida dengan menggunakan metode PNN (Probabilistic Neural Network). Metode ini dipilih karena memberikan korelasi yang lebih baik yaitu sebesar 68.8% dengan rata-rata error = 0.114, dibandingkan dengan Metode Multi-Layer Feed Forward (MLFN) yang memberikan nilai korelasi sebesar 50.9% serta multi-atribut sebesar 34.4%. Hasil dari penyebaran saturasi air tersebut selanjutnya diintegrasikan dengan data produksi dan dapat disimpulkan bahwa hasil penyebaran Sw telah mendekati kondisi aktual pada daerah disekitar sumur SNT-10 dan SNT-12. Hal ini ditunjukkan dengan nilai saturasi air yang dihasilkan yaitu 45-85% memiliki kesesuaian dengan profil produksi dimana kurva Water Cut dengan GOR masing-masing sumur naik secara cepat yang mengindikasikan air dan gas semakin banyak terproduksi, dibandingkan dengan minyak;Hydrocarbon identification is one of the main objectives of the Oil and Gas exploration and the estimation of saturation level is one of the important parameter to identify the possibility of hydrocarbon. The estimation of saturation value either using the numeric or the analytical method, seismic attribute coud be used. Even the relationship between seismic attribute and reservoir characterization could not be defined explicitely, but the used of this seismic atribut could give more assistance during the characterization process. Water saturation prediction in Shinta Field started with the transformation of the resistivity log using the Archi Equation, with the cementation factor (α) is 0.6, cementation exponent (m) is -2.15 and resistivity formation water (Rw) is 0.04. Furhter, this transformation result is used as the target of the fluid saturation prediction using the Probabilistic Neural Network (PNN). This method has been done through Artificial Neural Network, either using PNN method gives the better correlation i.e. 68.8% with the RMS value 0.114 compare to MLFN method which gave the correlation of 50.9% and Multi atribut with correlation level is
34.4%. Lateron, the result of Sw distribution has been integrated with production data which it can be concluded that the result has approach to the real condition of SNT-10 and SNT-12 well. It can be seen from

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