

INTISARI

KARAKTERISASI RESERVOIR KARBONAT DENGAN MENGUNAKAN INVERSI IMPEDANSI AKUSTIK DAN *PROBABILISTIC NEURAL NETWORK* PADA LAPANGAN “ADEN”, CEKUNGAN LAUT JAWA TIMUR UTARA

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Lapangan “ADEN” berlokasi di Cekungan Laut Jawa Timur Utara yang berpotensi mengandung hidrokarbon. Berdasarkan informasi geologi, lapangan ini memiliki beberapa bagian dari *petroleum system*, yaitu batuan induk, reservoir, batuan penudung, jebakan, dan migrasi. Formasi Kujung I memiliki potensi menjadi reservoir hidrokarbon dengan didominasi litologi batugamping. Beberapa cara untuk mengetahui karakter reservoir karbonat pada lapangan ini, maka dilakukan inversi impedansi akustik dan *probabilistic neural network* untuk prediksi properti log dari atribut seismik.

Data yang digunakan untuk melakukan karakterisasi reservoir karbonat pada penelitian ini, antara lain data seismik 3D PSTM dan data tiga buah sumur. Inversi impedansi akustik dilakukan dengan menggunakan teknik inversi berbasis model, sehingga diketahui persebaran impedansi akustik pada daerah penelitian. Karakterisasi reservoir juga dilakukan dengan *probabilistic neural network*, untuk memprediksi volume *properties* log sumur seperti densitas dan porositas total yang didapat dari data sumur. Integrasi dari hasil inversi impedansi akustik dan *probabilistic neural network* bisa digunakan untuk menentukan zona potensi hidrokarbon.

Berdasarkan hasil dari penelitian, diperoleh zona target reservoir memiliki karakter rentang nilai impedansi akustik 17000 – 24000 (ft/s)*(g/cc), nilai rentang densitas sebesar 2.1 – 2.28 (g/cc), dan nilai rentang porositas total sebesar 0.27 – 0.34 (v/v). Penentuan zona prospek hidrokarbon dengan melakukan integrasi peta struktur waktu, peta persebaran impedansi akustik, peta persebaran densitas, dan peta persebaran porositas total. Dari hasil peta integrasi tersebut didapatkan zona yang diindikasikan prospek hidrokarbon, yaitu zona A di bagian selatan sumur A-01, zona B di bagian barat sumur A-03, zona C berada di tenggara sumur A-02, dan zona D berada di timur sumur A-03.

Kata kunci : inversi seismik, karakterisasi reservoir, impedansi akustik, *probabilistic neural network*.

ABSTRACT

CARBONATE RESERVOIR CHARACTERIZATION USING ACOUSTIC IMPEDANCE INVERSION AND PROBABILISTIC NEURAL NETWORK IN “ADEN” FIELD, NORTH EAST JAVA SEA BASIN

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“ADEN” field which is located in Northeast Java Sea Basin could be potentially has the hydrocarbon. Based on geological information, the field has some part of petroleum system, which are the source rock, seal, trap, and migration. Kujung I formation have potential to be the hydrocarbon reservoir dominated with the lithology dominated by limestone. Some way to determine the carbonate reservoir characterization in this field, it is needed to do the acoustic impedance inversion and probabilistic neural network to predict log properties from seismic attribute.

The data which use to characterize carbonate reservoirs in this research, are 3D of PSTM seismic data and the data of three wells. Acoustic impedance inversion is done by using inversion technique of model based, in order to know the distribution of acoustic impedance in the research area. Reservoir characterization is also done by probabilistic neural network to predict the volume of log properties such as density and total of porosity from well's data. The integration of the result of acoustic impedance inversion and probabilistic neural network can be used to determine zone that has potential of hydrocarbon.

Based on the result of this research, is the obtained the target zone of the reservoir has the character of range of value in acoustic impedance is 17000 -24000 (ft/s)*(g/cc), the range of density is 2.1 – 2.28 (g/cc), and the value range of total porosity is 0.27 – 0.34 (v/v). Determination hydrocarbon prospects's by performing integration time structure map, a map of the distribution of acoustic impedance, density distribution maps, zone distribution of acoustic impedance, density distribution maps, and a map of the distribution of the total porosity. The integration result are obtained the zone which are indicated as hydrocarbon prospects, namely zone A in the south of well A-01, B zone in the west of well A-03, C zone in the southeast of well A-02, and D zone in the east of well A-03.

Keyword : *seismic inversion, Carbonate characterization, acoustic impedance, probabilitstik*