

ABSTRAK

KARAKTERISTIK DAN PREDIKSI PERSEBARAN *SHALE GAS RESERVOIR* MENGGUNAKAN METODE SEISMIK INVERSI *ACCOUSTIC IMPEDANCE* DAN SEISMIK MULTI-ATRIBUT *NEURAL NETWORKS* PADA FORMASI BAONG, LAPANGAN “ORION” CEKUNGAN SUMATERA UTARA

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Lapangan “Orion” terletak di Provinsi Sumatera Utara dengan target penelitian Formasi Baong bagian bawah, Cekungan Sumatera Utara. Tujuan penelitian ini adalah menentukan persebaran, mengkarakteristik, dan menentukan zona prospek *shale gas reservoir* pada Lapangan “Orion” dengan menggunakan analisis seismik multi-atribut *neural networks* berdasarkan data petrofisika *Total Organic Carbon* (TOC) dan *Brittleness Index* (BI) serta seismik inversi *acoustic impedance*.

Seismik multi-atribut *neural networks* digunakan untuk mengetahui properti *shale gas reservoir* berdasarkan data petrofisika berupa TOC digunakan untuk mengetahui kandungan fosil pada lapisan *shale*, dan BI digunakan untuk mengetahui tingkat kerapuhan pada *shale* karena *shale* memiliki 2 tingkat kerapuhan yaitu *brittle (Quartz-Rich)* dan *ductile (Clay-Rich)*. Data seismik *acoustic impedance* untuk mengkarakterisasi lapisan *shale* pada Formasi Baong.

Hasil seismik multi-atribut *neural networks* diperoleh nilai penyebaran TOC dan BI pada target Formasi Baong bagian bawah, dengan nilai TOC yaitu berkisar 1 – 6 wt% dan nilai BI yaitu berkisar 0,475 – 0,8. Sehingga diperoleh zona prospek yang ditandai dengan “mark I” dan “mark II”. Sedangkan untuk seismik inversi *acoustic impedance* tidak dapat memisahkan nilai AI untuk litologi *sand* dengan *shaly sand* tetapi nilai AI untuk litologi *shale* dapat dipisahkan dengan nilai AI 6000 hingga 8000 m/s.g/cc, sehingga seismik AI digunakan untuk *attribute* tambahan pada seismik multi-atribut *neural networks*.

Kata kunci : Multi-atribut *Neural Networks*, *Acoustic impedance*, *Total Organic Carbon*, *Brittleness Index*, Karakteristik *Shale Gas reservoir*

ABSTRACT

CHARACTERISTICS AND SPREAD SHALE GAS RESERVOIR PREDICTION BY USING SEISMIC ACOUSTIC IMPEDANCE INVERSION AND SEISMIC MULTI-ATTRIBUTE NEURAL NETWORKS BAONG FORMATION, "ORION" FIELD NORTH SUMATERA BASIN

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"Orion" field is located in the North Sumatera Province with a target research Lower Baong Formation, North Sumatera Basin. The purpose of this study was to determine the distribution, characterize and determine the zone prospects of shale gas reservoirs in the Field "Orion" by using analysis seismic multi-attribute neural networks based on data petrophysics Total Organic Carbon (TOC) and Brittleness Index (BI) as well as the seismic inversion of acoustic impedance

Seismic multi-attribute neural networks used to determine the properties of shale gas reservoir based on data petrophysics form of TOC is used to determine the content of fossils in the layers of shale, and BI is used to determine the level of fragility in the shale for shale has 2 levels of fragility that is brittle (Quartz-Rich) and ductile (Clay-Rich). Seismic data to characterize the acoustic impedance layers of shale Baong Formation.

Results of seismic multi-attribute neural networks obtained value TOC and BI deployment on the target lower Baong formation, with TOC values which ranged from 1-6 wt% and BI values ranged from 0.475 to 0.8. Thus obtained the prospect zones marked with "mark I" and "mark II". While seismic inversion to acoustic impedance can not separate the value of AI for lithology sand with shalysand but AI values for shale lithology can be separated with a value of 6000 to 8000 m/s.g/cc, so that seismic AI used for additional seismic attribute a multi-attribute neural networks.

Keywords : *Multi-attribute Neural Networks, Acoustic impedance, Total Organic Carbon, Brittleness Index, characterization Shale Gas reservoir*