

RINGKASAN

Penelitian di lapangan "MRE" Sub-Cekungan Jambi menggunakan metode seismik inversi *sparse spike* dan seismik multiatribut yang bertujuan untuk mengetahui karakter reservoir, menentukan lokasi sumur usulan, serta memahami sistem minyak dan gas bumi di wilayah ini. Secara geologi, lapangan "MRE" berada pada Formasi Air Benakat. Penulis menggunakan seismik inversi *sparse spike* karena lebih optimal dalam menunjukkan ketebalan reservoir di bawah resolusi vertikal seismik dibanding metode lain. Seismik multiatribut dengan *Multi-Layer Feed-Forward Network* (MLFN) dipilih karena mampu menangkap pola non-linear dalam data, mendukung interpretasi reservoir di bawah resolusi vertikal seismik. Data yang digunakan meliputi seismik 3D dan data dari 7 sumur beserta kelengkapannya. Analisis *crossplot* impedansi akustik menghasilkan nilai berkisar antara 5000 hingga 9900 (m/s)*(g/cc) pada setiap sumur, namun nilai impedansi akustik ini mengalami *overlap* antara litologi *sandstone* dan *shale*. Untuk mengatasi hal ini, dilakukan transformasi impedansi akustik ke porositas, yang berhasil memisahkan litologi tersebut. Berdasarkan hasil transformasi porositas dan analisis multiatribut MLFN, diperoleh estimasi porositas *sandstone* antara 15 - 35 (%) dan *shale* antara 0 - 15 (%) di sumur LNO-001; *sandstone* 12 - 30 (%) dan *shale* 0 - 12 (%) di sumur LNO-007; *sandstone* 10 - 30 (%) dan *shale* 0 - 10 (%) di sumur LNO-008; serta *sandstone* 10 - 26 (%) dan *shale* 0 - 10 (%) di sumur LNO-009. Hasil integrasi *depth map*, peta porositas *transform*, dan peta porositas MLFN pada lapisan RES#9 dan RES#3 direncanakan untuk penentuan sumur usulan 1 hingga 4 di area prospek A (*inline* 2456, *xline* 10230), B (*inline* 2447, *xline* 10211), C (*inline* 2470, *xline* 10201), dan D (*inline* 2462, *xline* 10182) pada kedalaman 1100 - 1570 meter, mengarah ke barat daya. Potensi hidrokarbon di area ini cukup signifikan, didukung oleh nilai porositas 15 - 30 (%) yang tergolong baik hingga istimewa. Selain itu, sistem minyak dan gas bumi di lapangan ini melibatkan Formasi Gumai dan Talang Akar sebagai batuan induk, dengan Formasi Air Benakat sebagai reservoir utama pada lapisan RES#9 dan RES#3. *Seal* efektif dari lapisan serpih serta perangkap struktural memungkinkan akumulasi hidrokarbon, sementara sesar-sesar di wilayah ini memainkan peran penting dalam migrasi hidrokarbon dari Formasi Talang Akar dan Gumai menuju reservoir di Formasi Air Benakat.

Kata Kunci: *Post Stack Migration*, Impedansi Akustik, *Multi-Layer Feed-Forward Network*, Porositas, Cekungan Sumatra Selatan

SUMMARY

Research in the 'MRE' field of the Jambi Sub-Basin using sparse spike inversion seismic and multiattribute seismic methods aims to determine the reservoir character, determine the location of proposed wells, and understand the oil and gas system in this area. Geologically, the 'MRE' field is located in the Air Benakat Formation. The author uses sparse spike inversion seismic because it is more optimal in showing reservoir thickness below the vertical resolution of seismic than other methods. Multiattribute seismic with Multi-Layer Feed-Forward Network (MLFN) was chosen because it is able to capture non-linear patterns in the data, supporting reservoir interpretation below the vertical resolution of seismic. The data used includes 3D seismic and data from 7 wells and their completions. Acoustic impedance crossplot analysis produced values ranging from 5000 to 9900 (m/s)(g/cc) in each well, but these acoustic impedance values overlap between sandstone and shale lithologies. To overcome this, an acoustic impedance to porosity transformation was performed, which successfully separated the lithologies. Based on the results of porosity transformation and MLFN multiattribute analysis, the porosity estimates of sandstone between 15 - 35 (%) and shale between 0 - 15 (%) in well LNO-001; sandstone 12 - 30 (%) and shale 0 - 12 (%) in well LNO-007; sandstone 10 - 30 (%) and shale 0 - 10 (%) in well LNO-008; and sandstone 10 - 26 (%) and shale 0 - 10 (%) in well LNO-009. The results of the integration of depth map, transform porosity map, and MLFN porosity map in the RES#9 and RES#3 layers are planned for the determination of proposed wells 1 to 4 in prospect areas A (inline 2456, xline 10230), B (inline 2447, xline 10211), C (inline 2470, xline 10201), and D (inline 2462, xline 10182) at a depth of 1100 - 1570 metres, heading southwest. The hydrocarbon potential in this area is significant, supported by porosity values of 15 - 30 (%) which are classified as good to excellent. In addition, the oil and gas system in this field involves the Gumai and Talang Akar Formations as host rocks, with the Air Benakat Formation as the main reservoir in the RES#9 and RES#3 layers. Effective shale seals and structural traps enable hydrocarbon accumulation, while faults in the area play an important role in the migration of hydrocarbons from the Talang Akar and Gumai Formations to reservoirs in the Air Benakat Formation.*

Keywords: Post Stack Migration, Acoustic Impedance, Multi-Layer Feed-Forward Network, Porosity, South Sumatra Basin