

ABSTRAK

PERBANDINGAN ANALISIS SEISMIK INVERSI *ELASTIC IMPEDANCE* (EI) DAN *EXTENDED ELASTIC IMPEDANCE* (EEI) UNTUK KARAKTERISASI RESERVOAR LAPANGAN “IAY”

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Cekungan Kutai merupakan salah satu cekungan terbesar dan terdalam di Indonesia dengan produksi minyak dan gas yang tinggi, namun secara alamiah reservoir mengalami penurunan. Dalam kegiatan meningkatkan angka produksi minyak dan gas terdapat kesulitan karena zona target reservoir yang tipis dan bersisipan dengan *shale*. Pendekatan menggunakan nilai impedansi akustik tidak lagi representatif terhadap kondisi di daerah penelitian, maka diperlukan pendekatan lain yang lebih efektif dengan memperhatikan parameter lainnya yaitu parameter elastik untuk dapat memisahkan litologi reservoir dan *non* reservoir menggunakan metode inversi. Pada penelitian ini menggunakan dua jenis inversi yaitu *Elastic Impedance* (EI) dan *Extended Elastic Impedance* (EEI) efektif dalam menentukan sebaran reservoir *checkshot*, *horizon*, dan *data well* (dua sumur). Zona target yang dianalisis berada di Grup Formasi Balikpapan. Berdasarkan hasil pengolahan diperoleh sudut optimum EI *near* 8°, EI *far* 30° dan parameter elastik yang sensitif yaitu V_p/V_s *ratio* dengan sudut Chi sebesar 38°. Sudut yang telah ditentukan digunakan sebagai *input* reflektivitas EI dan EEI serta sebagai acuan pada pembuatan model awal. Model awal inversi EI dan EEI menggunakan metode *model based soft constraint*, dengan nilai korelasi analisis inversi >0,9. Kemudian, dilakukan inversi EEI dan EI dan *slicing map* pada zona target. Hasil yang diperoleh zona reservoir *sand* memiliki nilai rendah yaitu 1.18 – 1.6 nilai EI *Near* berkisar 3500 - 4500 (m/s)*(g/cc), EI *Far* berkisar 300 – 900 (m/s)*(g/cc), dan EEI berkisar 3400 - 7000 (m/s)*(g/cc). Arah sebaran *sand* reservoir yaitu Baratdaya – Tenggara yang terbentuk pada lingkungan pengendapan delta *plain* – delta *front*.

Kata Kunci: *Elastic Impedance*, *Extended Elastic Impedance*, Reservoir, Seismik Inversi

ABSTRACT

COMPARISON OF ELASTIC IMPEDANCE (EI) AND EXTENDED ELASTIC IMPEDANCE (EEI) INVERSION SEISMIC ANALYSIS FOR "IAY" FIELD RESERVOIR CHARACTERIZATION

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The Kutai Basin is one of the largest and deepest basins in Indonesia, with high oil and gas production; however, it is naturally declining. To increase productivity, in-depth processing and interpretation were performed. However, it is considered difficult because the target zone of the reservoir is thin and interspersed with shale. The approach using the acoustic impedance value is no longer representative of the conditions in the study area, so another more effective approach is needed by paying attention to other parameters, namely elastic parameters, to be able to separate the lithology of reservoirs and non-reservoirs using the inversion method. In this study, two types of inversion, namely Elastic Impedance (EI) and Extended Elastic Impedance (EEI), are effective in determining the distribution of reservoirs based on Chi angle. The data used were in the form of partial angle stack, marker, checkshot, horizon, and data well (two wells). The target zone analyzed is in the Balikpapan Formation Group. Based on the processing results, the optimum angle of EI near 8°, EI far 30° and sensitive elastic parameters are obtained, namely Vp/Vs ratio with a Chi angle of 38°. The predetermined angle is used as an EI and EEI reflectivity input as well as a reference in the creation of the initial model. The initial model of EI and EEI inversion uses the model based soft constraint method, with a correlation value of inversion analysis >0.9. Then, EEI and EI inversions and slicing maps are carried out in the target zone. The results obtained by the sand reservoir zone had low values, namely 1.18 – 1.6, EI Near values ranged from 3500 - 4500 (m/s)(g/cc), EI Far ranged from 300 – 900 (m/s)*(g/cc), and EEI ranged from 3400 - 7000 (m/s)*(g/cc). The direction of distribution of the reservoir sand is Southwest – Southeast which is formed in the delta plain – delta front deposition environment.*

Keyword: *Elastic Impedance, Extended Elastic Impedance, Reservoir, Inversion Seismic*