ABSTRAK

PENGARUH FASIES DAN LINGKUNGAN PENGENDAPAN TERHADAP KARAKTERISTIK RESERVOIR BERDASARKAN ANALISIS MULTIATRIBUT *PROBABILISTIC NEURAL NETWORK* (PNN) DAN PENDEKATAN GEOSTATISTIK STUDI KASUS LAPANGAN "BERKAH" CEKUNGAN KUTAI

Oleh:
TRI WASPITO INDRIATMOKO
115.200.044

Lapangan Berkah merupakan lapangan produksi minyak dan gas bumi, secara fisiografi terletak pada Struktur Antiklinorium Samarinda, Blok Sanga Sanga, Cekungan Kutai, terdiri dari endapan silisiklastik produk fluvial-deltaik, termasuk kedalam Grup Balikpapan dengan litologi reservoir *sand*. Permasalahan hadirnya perkembangan *shifting channel* dan heterogenitas distribusi reservoir *sand*, diakibatkan proses progradasional dan perkembangan struktur antiklin pada Lapangan Berkah. Penelitian ini bertujuan untuk dapat mengetahui pengaruh fasies dan lingkungan pengendapan terhadap karakteristik reservoir berdasarkan permasalahan pada Lapangan Berkah. Kegiatan penelitian menggunakan data sumur dan data seismik pada interval zona reservoir target. Pada data sumur dilakukan interpretasi asosiasi fasies dan lingkungan pengendapan berdasarkan analisis sekuen stratigrafi. Pada data seismik dilakukan analisis kualitatif menggunakan *single attribute* untuk menunjukkan anomali DHI, sedangkan analisis kuantitatif menggunakan metode multiatribut *probabilistic neural network* (PNN). Selanjutnya dilakukan pemodelan 3D berdasarkan pendekatan geostatistik, dengan membuat model fasies dan model petrofisika pada properti *Vsh* dan *PHIE*. Tahap akhir mengetahui pengaruh fasies dan lingkungan pengendapan terhadap karakteristik reservoir di Lapangan Berkah. Berdasarkan hasil penelitian didapatkan perbedaan karakteristik reservoir pada zona reservoir A-12, A-25, dan C-02 yang berada pada lingkungan pengendapan *Lower delta plain* dengan asosiasi fasies *distributary channel* memiliki lebar *channel* keseluruhan 300 – 600 m, nilai *Vsh* sebesar 0,05 – 0,4 (*fraction*), dan nilai *PHIE* sebesar 0,15 – 0,3 (*fraction*). Pada zona reservoir B-04 berada pada lingkungan pengendapan *Delta front* dengan asosiasi *channel mouth bar* memiliki lebar *channel* 800 – 1000 m, nilai *Vsh* sebesar 0,1 – 0,4 (*fraction*), dan nilai *PHIE* sebesar 0,05 – 0,2 (*fraction*). Sehingga pengaruh fasies dan lingkungan pengendapan dari hasil penelitian sangat mempengaruhi lebar *channel* dan properti reservoir pada Lapangan Berkah.

Kata Kunci: Fasies, Geostatistik, Lingkungan Pengendapan, *Probabilistic Neural Network*

ABSTRACT

*THE INFLUENCE OF FACIES AND DEPOSITIONAL ENVIRONMENT ON THE CHARACTERISTICS OF THE RESERVOIR BASED ON MULTIATTRIBUTE ANALYSIS OF PROBABILISTIC NEURAL NETWORK (PNN) AND GEOSTATISTICAL APPROACH CASE STUDY OF THE "*BERKAH*" FIELD OF THE KUTAI BASIN.*

***By*:**
TRI WASPITO INDRIATMOKO
115.200.044

The Berkah Field is an oil and gas production field physiographically located in the Samarinda Anticlinorium Structure, Sanga Sanga Block, Kutai Basin, which consists of siliciclastic deposits of fluvial-deltaic products, including the Balikpapan Group with sand reservoir lithology. The problems of the development of shifting channels and the heterogeneity of sand reservoir distribution are caused by the progradation process and development of anticline structures in the Berkah Field. This study aimed to determine the influence of facies and depositional environments on reservoir characteristics based on problems in the Berkah Field. The research activities used well and seismic data from the interval of the target reservoir zone. In the well data, the association between the facies and depositional environment was interpreted based on stratigraphic sequence analysis. For the seismic data, qualitative analysis was carried out using a single attribute to show DHI anomalies, while quantitative analysis used the multiattribute probabilistic neural network (PNN) method. Furthermore, 3D modeling was performed based on a geostatistical approach by creating a facies model and petrophysical model of the Vsh and PHIE properties. The final stage was to determine the influence of facies and depositional environment on the characteristics of reservoirs in the Berkah Field. Based on the results of this study, it was found that the differences in reservoir characteristics in the A-12, A-25, and C-02 reservoir zones located in the lower delta plain sedimentation environment with the association of distributary channel facies had an overall channel width of 300 – 600 m, a Vsh value of 0.05 – 0.4 (fraction), and a PHIE value of 0.15 – 0.3 (fraction). In the B-04 reservoir zone, it is in the delta front deposition environment with a channel mouth bar association with a channel width of 800 – 1000 m, a Vsh value of 0.1 – 0.4 (fraction), and a PHIE value of 0.05 – 0.2 (fraction). Therefore, the influence of facies and depositional environment from the research results greatly affects the width of the channel and reservoir properties in the Berkah Field.

Keywords: *Facies, Depositional Environment, Geostatistics, Probabilistic Neural Network.*