

## ABSTRAK

### **PENENTUAN *RECOVERABLE RESERVE* PADA SUMUR “AA” LAPANGAN “SYA” MENGGUNAKAN SIMULATOR *MATERIAL BALANCE* (MBAL)**

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Lapisan “A1” dan lapisan “A2” pada sumur “AA” lapangan “SYA” merupakan lapisan minyak termasuk ke dalam Cekungan Kutai, Kalimantan. Lapisan ini sudah memproduksi minyak hingga Agustus 2023 masing-masing sebesar 3.40 MMSTB dengan *recovery factor* sebesar 31.22% dan 1.15 MMSTB dengan *recovery factor* sebesar 21.42%. Produksi pada kedua lapisan ini terhalang dikarenakan performa reservoir sudah menurun, sehingga diadakan prediksi untuk melihat kemampuan reservoir untuk berproduksi kembali.

Simulasi *material balance* lapisan “A1” dan lapisan “A2” dilakukan menggunakan simulator IPM-MBAL. Dilakukan evaluasi *inplace* dengan menghitung *missmatch* antara nilai OOIP statik dan OOIP simulasi. Kemudian penentuan parameter akuifer dengan cara regresi menggunakan metode Hurst-van Everdingen Modified. Selain itu juga dilakukan analisis mekanisme pendorong reservoir dengan plot energi pada simulator IPM-MBAL dan dilakukan prediksi selama 14 tahun hingga akhir kontrak untuk melihat performa reservoir.

Berdasarkan hasil simulasi yang dilakukan, diperoleh nilai *mismatch* nilai OOIP tidak melewati nilai maksimum yang ditentukan, yaitu 1% dan didapatkan nilai OOIP lapisan “A1” sebesar 10.92 MMSTB dan lapisan “A2” sebesar 5.37 MMSTB. Jenis mekanisme pendorong reservoir pada lapisan “A1” didapatkan mekanisme pendorong berupa *combination drive* antara *gas cap*, *fluid expansion*, dan adanya *water influx* dan lapisan “A2” berupa dominan *water influx* dengan sedikit *fluid expansion*. Serta setelah simulasi didapatkan *recoverable reserve* untuk lapisan “A1” sebesar 4.28 MMSTB dan lapisan “A2” sebesar 1.39 MMSTB. Kemudian berdasarkan hasil simulasi didapatkan *recovery factor* kedua lapisan naik, sebesar 8% untuk lapisan “A1” menjadi 39.2% dan lapisan “A2” naik sebesar 5% menjadi 26%.

Kata kunci: *recoverable reserve*, *material balance*, *drive mechanism*

## **ABSTRACT**

### **DETERMINATION OF RECOVERABLE RESERVES IN WELL “AA” OF “SYA” FIELD USING MATERIAL BALANCE SIMULATOR (MBAL)**

by

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*The "A1" and "A2" layers in the "AA" well in the "SYA" field are oil layers within the Kutai Basin, Kalimantan. These layers have produced oil at 3.40 MMSTB with a recovery factor of 31.22% and 1.15 MMSTB with a recovery factor of 21.42%, respectively, by August 2023. Production in these two layers was hampered due to declining reservoir performance, so predictions were made to assess the reservoir's ability to resume production.*

*Material balance simulations of the "A1" and "A2" layers were performed using the IPM-MBAL simulator. An in-place evaluation was conducted by calculating the mismatch between the static and simulated OOIP values. Aquifer parameters were then determined using regression using the Modified Hurst-van Everdingen method. Furthermore, an analysis of the reservoir's driving mechanisms was performed using energy plots in the IPM-MBAL simulator, and predictions were made for the 14-year period until the end of the contract to assess reservoir performance.*

*Based on the simulation results, the mismatch value of the OOIP value did not exceed the specified maximum value, which is 1% and the OOIP value of the "A1" layer was 10.92 MMSTB and the "A2" layer was 5.37 MMSTB. The type of reservoir driving mechanism for the "A1" layer with a driving mechanism in the form of a combination of gas cap, fluid expansion, and water influx and the "A2" layer in a form of dominant water influx and a bit fluid expansion. And after the simulation, the recoverable reserve for the "A1" layer was 4.28 MMSTB and the "A2" layer was 1.39 MMSTB. Then based on the simulation results, the recovery factor of both layers increased, by 8% for the "A1" layer to 39.2% and the "A2" layer increased by 5% to 26%.*

*Keywords: recoverable reserve, material balance, drive mechanism*