RINGKASAN

PERHITUNGAN CADANGAN MINYAK SISA PADA SUMUR "NI-08" LAPANGAN "NRA" MENGGUNAKAN METODE BLASINGAME

Oleh
Nia Nuraeni
NIM: 113190077
(Program Studi Sarjana Teknik Perminyakan)

Sumur NI-08 merupakan sumur produksi minyak yang telah berproduksi sejak 27 Juli 2007 dengan kumulatif produksi minyak tercatat sampai dengan 18 Maret 2013 sebesar 5,35 MMbbl. Selama masa produksi tersebut terjadi penurunan *rate* produksi dan kenaikan *water cut*. Dikarenakan hal tersebut maka diperlukan suatu analisis untuk memberikan *output* nilai cadangan minyak sisa yang dapat menentukan keberlanjutan produksi sumur NI-08. *Welltest* dilakukan sejak awal produksi sumur yakni pada Juli 2007, dengan hasil didapatkan permeabilitas (k) sebesar 168 mD, *initial pressure* (Pi) 19,09 Mpa, serta nilai ketebalan reservoir (h) 129,17 m. Selain dilakukannya *welltest*, dilakukan juga analisa PVT yang dilangsungkan pada tahun yang sama. Analisa PVT ini mendapatkan *output* nilai faktor volume formasi minyak (Bo) 1,61 m^3/stm^3, kompresibilitas total (Ct) $0{,}43\times10^{-3}$, viskositas fluida (μ) 0,43 mPa s, *initial water saturation* (Swi) 0,15, *residual oil saturation* (Sor) 0,3.

Analisa *welltest* dan analisa PVT dapat diintegrasikan dengan data sumur serta data produksi, sehingga metode yang dapat menjadi opsi adalah dengan menggunakan metode *decline curve analysis*. DCA pada sumur NI-08 dapat diaplikasikan dengan mempertimbangkan perubahan tekanan alir dasar sumur yakni dengan menggunakan Blasingame *production decline analysis.* Metode Blasingame, selain mempertimbangkan perubahan tekanan alir dasar sumur juga menerapkan data *rate* produksi minyak seiring berjalannya waktu *material balance* Blasingame (t_{cD}). *Rate* produksi tersebut di normalisasi menggunakan integral dan integral *derivative* yang kemudian dicocokan dengan *typecurve match* Blasingame sehingga didapatkannya *match point* dan r_{eD} yang selanjutnya diproses dengan perhitungan Blasingame menggunakan data PVT serta *constraint* pada *wellltest* sehingga dapat dihitung nilai cadangan minyak sisa.

Dari hasil BPDA dengan *constraint* permeabilitas 168 mD didapatkan parameter berupa, permeabilitas (k)168 mD, radius pengurasan terluar (re) 224 m, radius *wellbore* efektif (rwa) 0,02 m, nilai Skin positif 0,94, nilai EUR 8,59 MMbbl, serta cadangan minyak sisa didapatkan 3,24 MMbbl.

Kata kunci: Blasingame, *decline curve analysis*, integral, *typecurve match*

ABSTRACT

REMAINING OIL RESERVES CALCULATION IN WELL "NI-08" OF "NRA" FIELD BASED ON BLASINGAME METHOD

By
Nia Nuraeni
NIM: 113190077
(*Petroleum Engineering Undergraduate Program*)

The NI-08 well is an oil production well that has been in production since 27 July 2007 with cumulative oil production recorded up to 18 March 2013 of 5,35 MMbbl. During the production period there was a decrease in production rates and an increase in water cut. Because of this, an analysis is needed to provide an output value of remaining oil reserves that can determine the sustainability of NI-08 well production. The well test was carried out since the start of well production, in July 2007, with results obtained permeability (k) of 168 mD, initial pressure (Pi) 19.09 Mpa, and reservoir thickness (h) value 129,17 m. Apart from the well test, a PVT analysis was also carried out in the same year. This PVT analysis obtained output values for the oil formation volume factor (Bo) 1,61 m^3/stm^3, total compressibility (Ct) $0,43\times10^{-3}$, fluid viscosity (μ) 0,43 mPa s, initial water saturation (Swi) 0,15, residual oil saturation (Sor) 0,3.

Welltest analysis and PVT analysis can be integrated with well data and production data, so that the method that can be an option is to use the decline curve analysis method. DCA on the NI-08 well can be applied by considering changes in bottomhole flowing pressure, by using Blasingame production decline analysis. The Blasingame method, apart from considering changes in bottomhole flowing pressure, also applies oil production rate data over to the Blasingame material balance time (t_{cD}). The production rate is normalized using integral and integral derivative which are then matched with the Blasingame typecurve match so that match points and r_{eD} are obtained which are then processed by Blasingame calculations using PVT data and wellltest constraints so that the value of remaining oil reserves can be calculated.

From the BPDA results with a permeability constraint of 168 mD, the parameters obtained are, permeability (k) 168 mD, external drainage radius (re) 224 m, effective wellbore radius (rwa) 0.02 m, positive skin value 0.94, EUR value 8,59 MMbbl, and residual oil reserves were found to be 3,24 MMbbl.

Keywords: Blasingame, decline curve analysis, integral, typecurve match