

ABSTRAK

ANALISIS 1D GEOMEKANIKA DALAM EVALUASI NILAI MUD WEIGHT PADA PEMBORAN SUMUR “GTR-09”

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Pemboran sumur GTR-09 merupakan sumur pengembangan struktur GTR menerus ke Arah Barat, dengan Target utama lapisan TAF dan target tambahannya adalah Karbonat precibulakan yang dibor directional J Type dari cluster GTR sampai kedalaman akhir 2862 mMD (*total depth*). Evaluasi nilai *mud weight* pada sumur ini didasari pada terjadinya *problem* yang menyebabkan terjadinya *bore hole instability* dan *non productive time*. Pada saat pemboran berlangsung mencapai interval kedalaman 2145, 2214, dan 2222 mMD (*section 12 ¼”*) terjadi problem *loss circulation*, dan 2497 mMD (*section 8 ½ ”*) terjadi problem *loss circulation*. Oleh karena itu, diperlukan rekomendasi berat lumpur yang disesuaikan dengan konsep *safe mud window* serta mempertimbangkan faktor-faktor mekanika batuan sebagai dasar acuan dalam pelaksanaan operasi pemboran pada stratigrafi lapangan yang serupa.

Analisis *safe mud window* dilakukan dengan memanfaatkan data log sumur seperti *gamma ray log*, *density log*, dan *sonic log*, yang diolah menggunakan perangkat lunak *predict software*. Parameter tekanan bawah permukaan yang diestimasi dalam proses ini meliputi tekanan *overburden*, tekanan pori, tekanan rekah, *horizontal stress*, dan *collapse pressure*. Sebelum itu perlu diketahui mekanisme pembentukan *overpressure* pada sumur GTR-09 guna memilih metode estimasi yang sesuai.

Berdasarkan hasil Analisa *mud weight* melalui model geomekanika 1D, *Mud weight* yang di rekomendasikan pada saat terjadi *loss circulation* section 12 -1/4” diturunkan nilainya menjadi minimum dan maksimum 1.2 SG, Sedangkan *mud weight* yang direkomendasikan pada section 8 – 1/2” diturunkan nilainya menjadi minimum dan maksimum 1.27 SG.

Kata kunci: *Wellbore Stability*, Geomekanika 1D, *Safe Mud Window*.

ABSTRACT

1D GEOMECHANICS ANALYSIS FOR EVALUATION MUD WEIGHT VALUE IN DRILLING WELL “GTR-09”

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The drilling of well GTR-09 is a development well for the GTR structure extending westward, with the primary target being the TAF layer and the additional target being the carbonate pre-bulakan. It is our understanding that the well was drilled directionally using the J Type method from the GTR cluster to a final depth of 2,862 mMD (total depth). The evaluation of mud weight values in this well was based on issues that caused borehole instability and non-productive time. During drilling, there were some circulation loss issues at depth intervals of 2145, 2214, and 2222 mMD (12 ¼" section), and another circulation loss issue occurred at 2497 mMD (8 ½" section). Therefore, it would be beneficial to consider recommendations for mud weight adjusted to the safe mud window concept, taking into account rock mechanics factors as a reference for drilling operations in similar field stratigraphy.

The safe mud window analysis was conducted using well log data such as gamma ray logs, density logs, and sonic logs, which were processed using Predict software. The estimated subsurface pressure parameters in this process are said to include overburden pressure, pore pressure, fracture pressure, horizontal stress, and collapse pressure. In order to select the appropriate estimation method, it would be beneficial to first understand the mechanism of overpressure formation in the GTR-09 well.

It seems that, based on the results of the mud weight analysis using the 1D geomechanical model, the recommended mud weight during the loss circulation section (12-1/4") is reduced to a minimum and maximum of 1.2 SG, while the recommended mud weight for section (8-1/2") is reduced to a minimum and maximum of 1.27 SG.

Keywords: Wellbore stability, Geomechanics 1D, Safe Mud Window