عنوان مقاله:

Equivalent circulating density prediction using artificial neural network

محل انتشار:

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خلاصه مقاله:

Controlling the values of drilling parameters is the key method used by personnel in controlling equipment and their impact on the reservoir formation, and as a result, quality control of the well is proposed. One of the most important parameters is the Equivalent Circulating Density (ECD). If this parameter is not controlled, there will be many problems for drilling wells such as well flow and drilling fluid loss. Controlling this parameter is pretty important especially in wells with high temperature and pressure, deep water wells and wells with shallow margin between formation pore pressure and formation fracture pressure. To control ECD, having an accurate value of this parameter is needed. Nowadays, in order to have the value of these parameters in drilling operations, calculating of ECD by empirical correlations or measuring of ECD by Measuring While Drilling (MWD) and PWD tools are used. Using the empirical correlations is often erroneous due to different conditions and also not considering some parameters such as compressibility of drilling fluid and also the drilling cuttings concentration in annulus. In addition, using the MWD and PWD tools has a high cost and may fail in HP-HT wells.In this article, after obtaining data from one of the wells being drilled in Azadegan oil field, out-of-order data points were removed, which finally resulted in ۳۳,۰۰۰ data points. ۷۰% of the data were used for training the network neurons, ۱۵% for evaluation and ۱۵% for testing the extracted network. Finally, the resulting regression number shows ۰.۹۹. According to the regression value, it can be concluded that using the model presented in this article to calculate an accurate and actual amount of ECD is totally efficient and also can reduce the cost of using MWD and PWD tools as well as calculation error of ECD using empirical correlations

کلمات کلیدی:

equivalent circulating density, drilling parameters, formation pressure, fracture pressure, neural network