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FORECASTING THE PERFORMANCE OF AN OIL FIELD, COMPARISON OF VARIOUS USED METHODS: THE CASE OF SHUANGHE OILFIELD, CHINA

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Abstract:

While being the dominant source of energy, oil has also brought affluence and power to different societies. Energy produced from oil is fundamental to all parts of society. In the foreseeable future, the majority of energy will still come from oil production. Consequently, reliable methods for forecasting that production are crucial. Petroleum engineers have searched for simple but reliable way to predict oil production for a long time. Many methods have been developed in the latest decades and one common practice is decline curve analysis. Prediction of future production of petroleum wells is important for cost-effective operations of the petroleum industry. This work presents a comparative analysis of methods used to predict the performance of Shuanghe oilfield, China. Using decline curve analysis including three different methods: Arps empirical methods, LL-model and simplified model and the new simplified model, LLModel, to crosscheck Arps exponential decline model prediction results. The results showed by the comparative analysis of predictions calculated proved LL-model to be the best predictor for Shuanghe oilfield since it takes into account more parameters than the old models used in this work. However, the subsurface information or parameters of the reservoir used in LL-model may not be available every time, therefore Arps models may apply as defined. In Shuanghe oilfield calculated average geological reserves N was estimated at 9449.41 $\times 10^4$ tons, the average recoverable reserves N_R were estimated to 4274.61×10^4 tons while the water cut was 97% and the water cut predicted by LL-model was 96.7%; not far from water flooding curves value. The exponential decline model showed recoverable reserves N_R estimated around 4685.88×10^4 tons of oil while the decline phase of total development was estimated around 34 years which means that if the actual production conditions remain unchanged, Shuanghe oilfield would continue producing for another 25 years from 2008.

Key words: Shuanghe oilfield/ Oil production