Abstract

Condensate-to-gas ratio (CGR) plays a significant role in sales potential assessment of both gas and liquid, design of the required surface processing facilities, and reservoir characterization and modeling in gas-condensate reservoirs. Precise field and laboratory determination of the CGR is time and people intensive. Developing a rapid and inexpensive technique for accurate estimation of the CGR is inevitable. To tackle this issue, an intelligent model was proposed and the purpose of this paper is to illustrate how Fuzzy Decision Tree (FDT), which is an automatic method of generating fuzzy rules, can predict the condensate gas ratio, as a vital parameter in order to design the necessary wellhead production facilities in retrograde gas reservoir. As the FDT method is strongly based on applying widely and effectively the concept of ambiguity and furthermore, to do this project more accurately and less
dependent on experts’ knowledge, it was decided to gain from piecewise linear membership functions (MFs) whose parameters have automatically been dedicated through calculating a very special method of possibility density function (pdf). In conclusion, according to the calculated result, it is possible to exploit this method for CGR prediction field wide. The Fuzzy model was evaluated using the experimental data combined with some PVT data from the open literature. The model predictions were compared with the data from the actual field data and experimental runs. Results from this study indicate that the developed model can predict the CGR with good precision. The proposed model can serve as a reliable tool for quick and cheap but effective assessment of the CGR in absence of any adequate laboratory or field data.

References

- Zhang H. R., Wheaton R. J., “Condensate Banking Dynamics in Gas Condensate Fields: Changes in Produced Condensate to Gas Ratios”, International Oil and Gas Conference and Exhibition, China, Beijing, 7-10 November 2000.


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**Index Terms**

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**Keywords**

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