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A Preliminary Sedimentological Approach of Analog Reservoir with Darcy's Methods and Thin Section Analysis - Case Study of Walat Formation, Sukabumi, West Java

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Summary

The study is particularly applied to find the potential rock properties, such as porosity and permeability, which plays a significant role in determining a good reservoir form where the commercial flows of hydrocarbon can be produced. The study is located on Walat Formation, Sukabumi, West Java. The objective of this study is to examine the analysis of sedimentology based on the measured section in Walat Formation. Data are collected from field geological mapping, measured section, and direct sampling. Facies association based on the lithofacies analysis shows that the environment is controlled by fluvial depositional system which supports the occurrence of the continuity reservoir, and it has a similar characteristic in Talang Akar Formation as the analogue. The depositional history is investigated from the early research that shows that Walat Fm. was controlled by relatively low sea level along Paleogen and the global climate changes conditions at the Eocene-Oligocene. Darcy method and thin section analysis' result demonstrates that both of the properties confirm the capability of the rock to contain hydrocarbon. Therefore, Walat Fm. can be considered as a good potential reservoir and further study is recommended to conclude the prospect of the field.

Introduction

Based on regional physiographical map, study area located in Zona Bogor (Van Bemmelen, 1949). The Oligocene Walat Formation which is also referred as the equivalent of Bayah Formation (Martodjodjo, 2004) consist of interbedded sandstone, conglomerates and claystone with a few coal. The lithology were deposited in fluvial environment or river system. Nowadays, fluvial sediments are deliberated as some of productive petroleum basins in Indonesia deposited in fluvial environment. Therefore, analog study is very important as the application in determining reservoir sediments, supported by physical characteristic from darcy methods in this study. The objective of this study is to evaluate the reservoir potential in study area based on porosity and permeability as a fluvial deposits analog which already produced.

Method and/or Theory

Field geological mapping is conducted to collect the outcrop data from field observation. The boundaries between bodies and geological structures are systematically measured and recorded. The Walat Mountain was picked as the main traverse due to the representativeness of all lithology and sedimentary structures to identify the depositional environment, geometry or thickness of the section and the distribution of the lithology. Six rocks were sampled to be analyzed by Darcy methods using constant head mechanism where the height of water in observation is on constant point to define porosity and permeability supported by thin section analysis.

Conclusions

Walat Formation has a potential to be a good reservoir due to the fluvial sandstone as a productive reservoir in previous cases. Yet, the hypothesis needs to be further analyzed until the study area can be strongly argued to be prospectively good in containing hydrocarbon with Talang Akar Formation as the analogue.

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