



Reservoir Properties of the Zonguldak Formation, Located in the Western Black Sea Region, Northwestern Turkey

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The Zonguldak Formation (Westfalian-Stefanian), which is situated in the Western Black Sea basin, is considered to have hydrocarbon potential for coalbed methane (Yalcin and Inan 2001). Additionally, the shale levels of the delta environment of Alacaagzi Formation (Namurian), underline the Zonguldak Formation is considered to have a source rock potential (Derman and Iztan 1997; Sahinturk and Ozcelik 1983). The delta plain of the Zonguldak Formation consists of shales, coals and siliciclastic rocks which have deposited in the lake, marsh and river environment, having ranging from 1000 to 1400 m thickness. The coals and siliciclastics which belong to the formation have persistence in both onshore and offshore. Nevertheless, there have not been published data related to the reservoir rock potential of siliciclastic levels of the Zonguldak Formation which is recognized to have CBM potential.

Three deep research wells (Gegendere-1, Amasra -1 and Cakraz-1) have been drilled by TPAO on research area of the Western Black Sea Region to determine the hydrocarbon potential of the Zonguldak Formation. The Yilanli, Alacaagzi, Zonguldak, Cakraz, and Yemislicay formations have been penetrated in the wells. Methane was detected during drilling; but there was no economic detection from DST. The lithology of the Zonguldak formation was characterized through the core and cutting samples taken from the three wells and also thin sections. The petrographic studies were conducted on 44 thin sections, taken from core and cutting samples, indicating that they are fine to medium grained, moderate sorted, litharenite, sublitharenite, feldspathic arenite, carbonaceous mudstone, and quartz arenite composition. Cement materials are mainly clay matrix, and slightly calcite and silica. The XRD and SEM analyze show that the clay types are kaolinite, illite, chlorite and smectite, and high API values from GR logs support that siliciclastics levels have high content clay matrix. Petrographic determinations show that porosity ratio is less than 1%. The core plug samples taken from the Amasra-1 were used to better understanding about the petrophysical properties. Porosity and permeability values are 1,7-2,4% and 0.01-0.03 md, respectively. The petrographic, petrophysical, mineralogical and reservoir rocks analyses on the siliciclastic levels of the Zonguldak Formation indicate that the formation has a poor reservoir potential in the studied wells.

References

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