

Influence of deformation bands on Nubian sandstone reservoir quality, Eastern Desert, Egypt

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The importance of the Nubian Sandstone is regarded to the capability of this rock unit to store and produce large volumes of hydrocarbons in the Gulf of Sues, Egypt. The Nubian Sandstone consists of a sequence of sandstones and shales that formed during the Paleozoic to Cretaceous. Samples were examined for the petrographic and petrophysical characteristics. Two sets of deformation bands exist at the study area. There are no differences in the mineralogy between the Nubian Sandstone and the deformation bands, and both consist primarily of quartz. The main petrographic difference is the grain size which is reduced greatly in the bands. Plugs of 1.5” diameter of the Nubian Sandstone with and without bands were examined to

measure gas porosity and permeability. The plugs showed a variation in these two factors along the deformation bands. The porosity in the Nubian Sandstone ranges from 24 to 30 % whereas it is reduced to 9 to 16 % in plugs containing deformation bands. A similar trend is detected for permeability that is strongly reduced from 1200–8400 mD in samples without bands to 0.08–0.3 mD in samples with bands. The orientation of the deformation bands shows a relationship to the regional tectonic settings of the Red Sea rifting. The mineralogical, petrographic and petrophysical investigations document a negative influence of the deformation bands on the capacity of Nubian sandstone reservoir.