

The Influences of Facies and Fine Kaolinite Formation Migration on Sandstone's Reservoir Quality, Sarir Formation, Sirt Basin Libya

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Abstract : The spatial and temporal distribution of diagenetic alterations related impact on the reservoir quality of the Sarir Formation. (present day burial depth of about 9000 feet) Depositional facies and diagenetic alterations are the main controls on reservoir quality of Sarir Formation Sirt Basin Libya; these based on lithology and grain size as well as authigenic clay mineral types and their distributions. However, petrology investigation obtained on study area with five sandstone wells concentrated on main rock components and the parameters that may have impacts on reservoirs. the main authigenic clay minerals are kaolinite and dickite, these investigations have confirmed by X.R.D analysis and clay fraction. mainly Kaolinite and Dickite were extensively presented on all of wells with high amounts. As well as trace of detrital smectite and less amounts of illitized mud-matrix are possibly find by SEM image. Thin layers of clay presented as clay-grain coatings in local depth interpreted as remains of dissolved clay matrix is partly transformed into kaolinite adjacent and towards pore throat. This also may have impacts on most of the pore throats of this sandstone which are open and relatively clean with some fine martial have been formed on occluded pores. This material is identified by EDS analysis to be collections of not only kaolinite booklets but also small disaggregated kaolinite platelets derived from the disaggregation of larger kaolinite booklets. These patches of kaolinite not only fill this pore but also coat some of the surrounding framework grains. Quartz grains often enlarged by authigenic quartz overgrowths partially occlude and reduce porosity. Scanning Electron Microscopy with Energy Dispersive Spectroscopy (SEM) was conducted on the post-test samples to examine any mud filtrate particles that may be in the pore throats. Semi-qualitative elemental data on selected minerals observed during the SEM study were obtained through the use of an Energy Dispersive Spectroscopy (EDS) unit. The samples showed mostly clean open pore throats with limited occlusion by kaolinite. very fine-grained elemental combinations (Si/Al/Na/Cl, Si/Al Ca/Cl/Ti, and Qtz/Ti) have been identified and conformed by EDS analysis. However, the identification of the fine grained disaggregated material as mainly kaolinite though study area.

Keywords : pore throat, fine migration, formation damage, solids plugging, porosity loss

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