

Reservoir Characterization of wells KD1, KE1, KF1, KH1, in block 3, Orange Basin, offshore South Africa

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ABSTRACT

Petroleum reservoir characterization can be described as a process that includes integrating, analyzing and understanding all available data from the well. Understanding the reservoir characteristics plays a pivotal role for the optimization towards the well performance.

The two fundamental properties that govern the quality of reservoir rocks are porosity and permeability. Clay minerals in contrast, have a major influence on reservoir quality. Clay minerals occlude pore spaces, coats grain surfaces, and swells in the presence of water. Thus petroleum drilling operations and reservoir management also becomes affected.

The main aim of this study is to provide a clear understanding and description on reservoir heterogeneities of four wells (i.e. KD1, KE1, KF1, and KH1) allocated within block 3 of the Orange Basin. The objective of this study are 1) to quantify the effect of clay minerals on reservoir quality (RQ), 2) to identify and characterize potential reservoir zones, 3) evaluate the reservoir properties 4) use of graphical techniques 5) implications on production of hydrocarbons. The objectives of this study will be achieved and accomplished by using wireline logs, core data, X-ray diffraction (XRD), thin-sections and scanning electron microscope (SEM) analyses.

Expected outcomes of this study includes, tight gas reservoir sands, fair to relatively high reservoir quality rocks, high net to gross ratios, variable poroperm values, increasing clay content with burial depth that influences RQ, high quartz cementation and diagenetic processes controlling RQ.