

Abu Roash F Member as a Potential Self-sourced Reservoir in Abu Gharadig Basin, Western Desert of Egypt

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ABSTRACT

The Cenomanian-Turonian Abu Roash F member (ARF) is the main source rock for oil in Abu El-Gharadig (AG) basin. It is composed of open-shelf argillaceous limestone, rich in organic matter with very low matrix permeability. The aim of the current work is to improve our understanding of ARF as a source rock and as a potential unconventional resource as well. The organic richness is probably attributed to the Cenomanian-Turonian global anoxic event. The study area is located in the eastern part of AG basin in the north Western Desert of Egypt. ARF reservoir model characterization and paleoenvironmental reconstruction have been tackled based on Core data, E-logs interpretation, petrographic and SEM analysis in addition to seismic interpretation.

ARF is a remarkable stratigraphic unit in AG basin characterized by low gamma ray and high resistivity responses, organic richness as well as strong seismic reflectivity. In the study area ARF varies in thickness between 120ft in NE to 60ft in SW as a result of on-lapping of ARF on top of ARG member as revealed from seismic and biostratigraphic data.

ARF is composed of two carbonate intervals (up to 55ft in thickness) with a shale unit in-between (up to 10 FT in thickness), amalgamated into one carbonate interval to the southwest of the field.

ARF represents maximum flooding event associated with extensive shelfal carbonate deposition prograding into the overlying highstand, clastics of ARE member.

In the study area, ARF is a type-II oil prone marine carbonate source rock with TOC ranging between one and 3%, HI range of 440-550 and OI range of 15-25.

The petrophysical analysis of ARF revealed permeability range between 0.1 and 0.001, while its porosity varies from 20% to 25 % with an average 15%.

To fully evaluate ARF as unconventional reservoir it is necessary to understand its mechanical properties and present day stress to assess the proper fracking method and horizontal drilling as well as some other criteria like depth limitation, nearby water contact, etc.