

BPM05

## Komombo Petroleum Systems Modeling Study- Western Desert – Egypt

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### SUMMARY

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1D, 2D and 3D hydrocarbon charge modeling and source rock characterization had been performed in the Komombo area to re-evaluate the exploration potential in the development area and to evaluate the poorly explored regions in the northwestern part of the basin, and to address uncertainties about the potential prospects in the block.

1D models helped to understand the burial and thermal history and the impact of multiple erosion on timing of maturity and hydrocarbon generation. 2D modeling (in the development area) provided information on timing of hydrocarbon generation, on the effect of fault sealing capacities and litho-facies distribution on migration and accumulation of hydrocarbons. In addition different migration methods were applied, which helped to understand the petroleum systems of the Komombo basin. This gained insight was used for the 3D petroleum system model of the greater Komombo basin. The main objective of 3D modeling was to understand hydrocarbon migration and accumulation and its timing.

Maturity and hydrocarbon generation are mainly controlled by Late Cretaceous to Eocene burial and the second heat pulse at ~40 Ma; another key parameter is the Tertiary erosion thickness. Only in the deepest part of the basin Komombo-B source rocks are already in oil window during Early Cretaceous.

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Based on the modeling results, the Early Cretaceous Komombo-B unit is the most important source rock. Hydrocarbons generated from this source rock are accumulated in several reservoir rocks (Komombo-A and sandstones within several Six Hills formations). Structures started to get filled with Komombo-B hydrocarbons mainly after ~85 Ma. Migration-accumulation-remigration is predicted to have ceased at ~45 Ma. Accumulations have been predicted to be accumulated in structural traps (anticlines and faults) and stratigraphic traps (facies change and onlaps).

The Late Cretaceous Abu Ballas source rock is only of minor importance (**Error! Reference source not found.**). Basin-wide hydrocarbons are generated since ~80 Ma, but were expelled not before ~48 Ma. Only very few, isolated and small accumulations have been predicted in Late Cretaceous shale units.

Although Taref Coal and Dakhla source rock are effective source rocks, maturity is not sufficient for hydrocarbon generation (transformation ratio < 1%).