
Static and Dynamic Modeling of an offshore field, UAE

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An integration of all geophysical, petrophysical, geological and reservoir Engineering data have been used to characterize the Middle Cretaceous carbonate reservoir in the X structure offshore Abu Dhabi, United Arab Emirates.

The X structure, defined as an undulated faulted anticline with a structural relief of 180 feet and an area of 112Km², was formed originally by the movement of the Precambrian salt during the Cretaceous time. The main producing horizon, Mishrif formation consists of a carbonate section that was deposited over an extensive carbonate ramp platform with reefal facies at the upper part of the reservoir unit.

A rock type scheme for the Mishrif reservoir resulted in generating fourteen lithofacies. The petrophysical properties of these lithofacies have been analyzed to develop a basis for detailed reservoir fine layering, constructing a 3D static model and simulation studies. The main pore types within this reservoir are interparticle porosity ranging from 11 to 27% with an average of 23%. The permeability ranges from 0.1 to 750 md with an average of 65 millidarcy.

The properties of the reservoir have been populated geostatistically with different algorithms within the framework of the field. After modeling the facies using the sequential indicator simulation, the porosity was populated using the sequential Gaussian simulation algorithm. The cloud transform technique has been used for modeling the permeability. The resulted static model improved the understanding of the flow regime within the field and matched well with the dynamic data from the wells
