

# Integration of Laboratory Measurements and Well Log Data for Reservoir Characterization of Carbonate Field, India: A Case Study

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The Mukta field is located in the north-western part of Heera-Bassein block in Bombay Offshore Basin, India. The field is situated in the western vicinity of Panna field with syncline in between and is around 25 km east of giant Bombay High field. The Mukta field was discovered in 1981 by drilling first well in the eastern culmination of the structure and produced oil and gas from Bassein limestones of Eocene to early Oligocene in age. The field has subsequently been delineated by drilling more E & A wells. Currently, the field is producing from a single wellhead platform.

The present paper focuses on the understanding of reservoir characteristics using well log data in conjunction with lab measurements. The study has been carried out in one part of the field that is currently under development phase. The Thin section Petrography, Core NMR and Mercury Intrusion Capillary Pressure (MICP), and well log data shows that the dominant lithology is clean limestone having all three type of porosity (Micro, Meso, and Macro) with dominance of Meso porosity system. The presence of multi-layered reservoirs is explained through the texture analysis along with capillary pressure data. The petrophysical evaluation shows that the water saturation in the reservoir zones is governed by height from FWL and porosity development. The study also depicts that the reservoir zones are under transition due to insufficient height above Free Water Level (FWL).

A Single Well Predictive Model (SWPM) study has been carried out and results were compared with those of the Drill Stem Tests (DSTs) carried out in the well. A good match between both SWPM and DST results (Kh, Radius of Investigation, and PI) was seen. The study is helpful in decision making for future development of the area.