

Seismic Interpretation and Petrophysical Evaluation of SM Field, Libya

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Abstract : The G Formation is a major gas producing reservoir in the SM Field, eastern, Libya. It is called G limestone because it consists of shallow marine limestone. Well data and 3D-Seismic in conjunction with the results of a previous study were used to delineate the hydrocarbon reservoir of Middle Eocene G-Formation of SM Field area. The data include three-dimensional seismic data acquired in 2009. It covers approximately an area of 75 mi² and with more than 9 wells penetrating the reservoir. Seismic data are used to identify any stratigraphic and structural and features such as channels and faults and which may play a significant role in hydrocarbon traps. The well data are used to calculation petrophysical analysis of S field. The average porosity of the Middle Eocene G Formation is very good with porosity reaching 24% especially around well W 6. Average water saturation was calculated for each well from porosity and resistivity logs using Archie's formula. The average water saturation for the whole well is 25%. Structural mapping of top and bottom of Middle Eocene G formation revealed the highest area in the SM field is at 4800 ft subsea around wells W4, W5, W6, and W7 and the deepest point is at 4950 ft subsea. Correlation between wells using well data and structural maps created from seismic data revealed that net thickness of G Formation range from 0 ft in the north part of the field to 235 ft in southwest and south part of the field. The gas water contact is found at 4860 ft using the resistivity log. The net isopach map using both the trapezoidal and pyramid rules are used to calculate the total bulk volume. The original gas in place and the recoverable gas were calculated volumetrically to be 890 Billion Standard Cubic Feet (BSCF) and 630 (BSCF) respectively.

Keywords : 3D seismic data, well logging, petrel, kingdom suite

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