Potential Opportunities Below the Oil-Water Contact of the Arab D Reservoir, Awali Field

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The study aims to bring out the distribution of oil below the original oil water contact of Arab "D" reservoir of Awali field. Distinct vertico-lateral facies variation account for oil entrapment below the OWC and referred as residual oil. The inferred residual oil limit is dependent on the value of PhiHSo irrespective of depth and it differs from eastern flank to that of western flank. Estimation of residual oil in place is based on weighted average water saturation and weighted average porosity with two water saturation cut offs such as Sw>30% and Sw>40%. It is observed that the high PhiHSo values fall in the crestal part of the field with a NNW-SSE orientation. Preferential alignment of high values corresponds to better reservoir facies observed in core data.

3D Seismic attributes are integrated with Petrophysical and Geological data. Composite window seismic horizon attributes from Arab D top to its bottom such as amplitude and frequency provided circumstantial evidences and a meaningful relationship with facies variation. The 3D seismic attributes could reasonably be corroborated with Lower Arab D reservoir in the axial part of the Awali field and brought out a considerable distinct attribute anomaly in the direction of NNW-SSE. The study suggests prospective locations to be tested in Lower Arab D based on these anomalies.

The residual oil in place in several intervals in Arab "D" member below the contact is substantial in a relatively narrow strip and holds possibilities for the application of enhanced oil recovery processes in future.