The pre-Khuff principal reservoir, Unayzah formation consists mainly of distal braid plain sandstones with minor aeolian deposits. Facies controls on reservoir quality are weak. Quartz cement, Illite and compaction are the main causes of reductions in reservoir quality in the Unayzah. Quartz cementation tends to be most severe in the clearest, coarsest sandstones and near certain fractures.

Paleozoic seals are provided by the Basal Khuff Clastics, tight basal Khuff carbonate and Middle Khuff Anhydrite. The base Khuff carbonate seal does not appear to be regional extensive, but localised and potentially prospect specific. However, there are insufficient data to accurately define the seal for the Unayzah hydrocarbon accumulations.

The main challenge that faced the Paleozoic source evaluation and basin building was the presence of few deep well penetrations. Therefore, much of the unknown source and tectonic information were derived from the surrounding countries. This comes from understanding the regional tectonics and depositional trends of the southeastern Arabian plate, which helped extrapolate the source trends into the Abu Dhabi area.

The Silurian source rocks basin modeling was constructed to define the timing of hydrocarbon charge from this source rocks. Also, the objective of this modeling was to gain an understanding of how the Paleozoic hydrocarbon system works and, specifically, comparing the timing of hydrocarbon charge with the timing of fields structural growth history. The basin modeling work of the Silurian Hot Shale source rocks started by building an extensive database, which includes the information related to source rock distribution, heat flow of the basin and the construction of the stratigraphic and the lithological models. Additional inputs such as tectonic events and estimating the magnitude of the removed section, during the erosional events, were added.

The current maturation modeling indicated that oil from Silurian source rocks was generated early in the basin history and was widespread by the Late Triassic (220 Ma). Significant gas was present by Lower Cretaceous (140 Ma) and dominated the hydrocarbon system by Middle Cretaceous (110 Ma). Significant high mature gas was generated in the early Tertiary (50 Ma). At present-day, charge is still active in the north of Abu Dhabi.
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