

# **An Integrated Assessment of the Petroleum Systems of the Central Oman Akhdar Group - New Insights on the Key Ingredients for Success**

**Asma S. Al Kindi<sup>1</sup>**

<sup>1</sup>PDO

## **Abstract**

The Permo-Triassic Akhdar Group is an emerging play in Central Oman. Until recently, it has been relatively underexplored in Central Oman; however, recent discoveries by PDO suggest it has the potential to become a new core play in Central Oman. Most of the Akhdar Group sediments were deposited under dominantly arid conditions on an extensive flat and shallow carbonate platform, and consists of four formations, from oldest to youngest: Khuff, Sudair, Jilh and Minjur. Reservoir quality is primarily controlled by facies, architecture, and diagenesis. Variation in hydrocarbon fluid phase, quality, and charge risk are additional challenges.

Understanding the controls of these critical technical elements is the key for the continued economic success of this emerging play.

Present day source rock maturity and expulsion timing are predicted to be the dominant controls on the expected fluid phase. The observed fluid properties and quality are influenced by reservoir temperature, fluid residence time and fresh recharge pulse.

Proven reservoirs are developed within the Permian Khuff and Sudair formations. They represent a laterally extensive shallow marine deposition on an epeiric carbonate platform. Reservoir quality is controlled by both depositional fabric and dolomitization.

Diverse trapping configuration have been identified including structural and truncation/stratigraphic trapping mechanisms. Seismic reservoir characterisation workflows using deterministic and geostatistical inversion techniques were also carried out to sweet-spot reservoir fairways.

Utilising the insights from this carefully integrated approach, we have gained a significant update to our understanding of the controls on the key play elements required for success, delivered a set of play and segment sweet-spot maps, and generated a new portfolio of exploration growth opportunities. This integrated, data driven evaluation underpins the portfolio rationalisation and its current polarisation.