

## **Manal Basal Sands: A New Exploration Concept in the Oman Heartland**

**Oswaldo Davogustto Cataldo<sup>1,2</sup>, Manu Singhal<sup>2</sup>, Lang Zhang<sup>2</sup>, Ibrahim Al Rajibi<sup>2</sup>, Rifaat Al Mjeni<sup>2</sup>**

<sup>1</sup>Shell Exploration and Production

<sup>2</sup>Shell Development Oman

### **Abstract**

Oman has been a prominent oil and gas producer since the 1960s, boasting a unique setting conducive to prolific petroleum systems. Despite nearly 50 years of exploration, the challenge in Oman lies in devising new concepts and ideas to unlock its untapped hydrocarbon potential. The fluvial/alluvial Manal Basal sands (MBS), associated with the Western Deformation Front, present a novel geological concept developed through integration of new AVO-compliant reprocessed seismic data, regional stratigraphic reports, and existing well data. Our geologic model posits that these sands, recently penetrated by one of our wells with encouraging results, were previously misinterpreted as part of the Miqrat Formation. Our primary objective is to assess the potential of better developing these basal sands at a location up-dip from our current well. We attribute the main failure mechanism to seal complications arising from the stratigraphic complexity and uncertainty in the study area. Among the six evaluated wells suggesting the presence of basal sands, two show promising saturations, one indicates seal failure, two lack reservoir charge, and one encounters no reservoir.

The proposed up-dip location also offers an opportunity to calibrate our current geophysical model. We hypothesize that this well could reveal an additional failure scenario—a recurrence of wells in the area with poor reservoir despite strong seismic responses. This scenario serves as an alternative to the primary risk of seal failure, identified as a false positive from the geophysical model.

Furthermore, we have identified another opportunity in the same area, suggested by deeper stratigraphy indicated in seismic data. Our hypothesis suggests that this opportunity represents an initial stage of incision and subsequent fill of negative topography associated with the Western Deformation Front. We propose a connection between this opportunity and the opportunity described earlier, with the latter signifying the final stage of deposition from the western source before a potential shift to dominant sediment input from the Eastern Ghaba Basin in the Manal area. This initial stage of incision and fill, observed locally in the area of interest on the newly reprocessed seismic dataset without well calibration, presents an exciting prospect for frontier exploration in Oman, a region traditionally recognized for its well-established petroleum industry.