

Successful Near Field Exploration Case Study from Permian Alkhata Sandstone and Cambrian Ara/Birba Dolomite Oil Discoveries in the Sultanate of Oman

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Abstract

South Oman Small Field (SOSF) Asset with a total area of 745 km², features highly dense small-sized oil fields which have produced a cumulative oil of ~30 MMBOE since production began in the late 1980s. In 2016, a new exploration contract was awarded to Medco to assess new opportunities related to Near-Field Exploration (NFE) to arrest production decline and increase the reserve replacement ratio. In the first five years of the exploration campaign, seven wells have been drilled with a relatively low success rate of 40%. Since 2021, after the completion of a regional study by applying the Play-Based Exploration (PBE) method in combination with new 3D seismic WAZ (Wide Azimuth) data, a 100% exploration success rate can be achieved.

A strategic exploration business process has been employed when conducting a regional basin prospectivity study in the SOSF mature basin. The process comprises 1) Data evaluation and regional framework (Option Stage), 2) Play-Based Exploration (PBE) study (Selection Stage), 3) Cluster oriented and selective high-grade prospect maturation (Definition Stage) and 4) Drilling, formation data acquisition and completion well testing (Execution Stage). The cluster-oriented PBE method emphasizes the evaluation of smaller study areas to have faster project cycle time along with a compact team and constricted timeline.

The results from the last three years of the exploration campaign were beyond expectations. New production from these fields is projected to increase daily oil production by up to 12% of total company production by the end of 2024. The cluster-oriented PBE method for regional basin prospectivity study has been demonstrated to be a great success. The replication of this method for selecting upcoming exploration wells in SOSF mature assets will impact project cycle acceleration and improved exploration success ratio.