Overcoming Structural Uncertainties in a Reef-Developed Thin Oil Reservoir in the Middle East

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Development drilling operations in a carbonate reservoir in the United Arab Emirates involve drilling and placing horizontal wells within layers of uneven surfaces. The structure of these surfaces is not well defined, due to lack of seismic resolution and limited offset data. Karsts and general undulations in the sub-surface coupled with presence of shale lenses make the planning and drilling of these wells a difficult task, as major lateral changes are a common occurrence.

A radical new approach was undertaken to improve the length and also placement of horizontal wells in this field. A team of specialists was formed, comprising geoscientists and drilling engineers. Also, cutting edge well placement technology was utilized in order to provide the team with distance-to-boundary information.

The present paper describes how an expert team based in the head office overcame the challenges presented by monitoring the progress of the well and making real-time decisions on the changes required to the well trajectory for optimum placement. The success of the new approach lies in the cross-discipline of advisors present in the team, the application of new distance-to-boundary technology, and the continuous communication with the well-site geologist and directional drilling engineer. All well objectives were met. Also, an improved understanding of the regional geology of the area around the well was achieved, thus helping to update the existing geological model for better description of the reservoir.