Drilling Beyond the Boundaries of Complex Extended Reach Well in Al Nouf Field, Abu Dhabi, Uae

Author block: M. Asef Hashmi, ADNOC Onshore.

Abstract

Objectives/Scope: Well was drilled in Al Nouf field with the objective to support the pressure sustainability of multiple producer wells across Kharaiib-2 formation based on MRC / ERD approach. This paper presents the challenges faced in planning and drilling of subject well to total measured depth of 32,101ft (9.8 km) with having horizontal section of 13,334ft (4 km) with directional difficulty index (DDI) of 7.483 using heavy casing design.

Methods, Procedures, Process: Planning of this well commenced by meetings and collaboration with subsurface operation and reservoir team with the common objective of drilling a well of over 13,300ft horizontal extent and having a capability of running 4 ½" pre-perforated liner with multiple swell packers as lower completion to desired well depth across permeable reservoir. All the associated risks were highlighted and mitigated by proper planning and engineering analysis such as trajectory, collision risks, BHA, hydraulics and casing design.

Results, Observations, Conclusions: This MRC/ERD Oil producer well of 32,101ft MD / 9127 ft TVD (3.52 ERD H:V ratio) is the first well in the region to have 13,334ft of geo-steered across 6" horizontal section with directional difficulty index (DDI) of 7.483This paper will explain the innovative and novel approach of mitigating the challenges faced while drilling a complex well of 11,400ft departure and have a horizontal section of over 13,334ft with 6" drainage. A few challenges like sidetracking from existing casing by cutting dual casing, drilling across the faults across horizontal hole section and collision risk at horizontal section were major concern but successfully catered. Second major challenge was to run 4 ½" pre-perforated liner of 4,000ft with multiple swell packers (each 500ft) of well were immaculately mitigated with advanced engineering analysis and innovative technologies like swivel master etc. Results from this well have proven that having lower completion in MRC / ERD wells have significantly improved the well accessibility and well performance and enhanced the reservoir management and significantly reduced the field development cost. This paper summarizes the practice and technology used to successfully drill the MRC / ERD well in artificial island.

Novel/Additive Information: The challenges and its mitigation explained in this paper will support the idea to plan and drill the well beyond the reservoir boundaries to gather more data and to enhance more production. Also, this paper will provide novel approach of having lower completion in MRC/ERD wells which helps to attain more control on injectivity / productivity of reservoir because of proper isolation by swell packers and have maximum well accessibility across ERD horizontal section.