Successful PMCD Application Enabled To Drill A Complex Multi-fractured Formation

M. Guiza, N. Otaibi, Saudi Aramco D&WO; G. Kheir, H. Duno, Halliburton

Abstract
Objectives/Scope: This paper describes a successful application of Pressurized Mud Cap Drilling (PMCD) technology. PMCD technology has been used worldwide in wells under total losses scenarios to enable drilling ahead with sacrificial mud.

Methods, Procedures, Process: In this application, the pilot hole section and sidetrack section had to be drilled throughout a naturally multi-fractured formation in which total losses were expected. The objective of the pilot hole was to gather information for proper planning of the laterals away of the oilwater contact. In order to achieve the objectives of the well, the planning team chose the PMCD technique to manage the losses and to avoid any well control incidents during the execution of the operations.

Results, Observations, Conclusions: The “S” shape pilot hole section was drilled with insert tricone bit, motor, MWD/LWD and non-damaging water base mud. After drilling +/- 200 ft of the reservoir section, total losses were experienced and PMCD technique was activated. The system allowed to continue to drill ahead to the planned section depth with light sacrificial fluid (water) and viscous water in the annular space keeping pressure continuously on the back side of the well while drilled cuttings and returns were injected into the loss zone. The information gathered from the pilot hole allowed the multidisciplinary team to plan the subsequent laterals (4) with optimum well placement, away from the oilwater contact. After plugging and abandoning the pilot hole as per the plan, a sidetrack hole was drilled and total losses were experienced. Then, PMCD technique was used again to reach the section total depth (TD). Production liner were run successfully so subsequent laterals could be drilled across it.

The successful application of this technology enabled to drill under total losses through the multi-fractured section without any well control incidents or safety implications. Moreover, additional and unforeseen costs of the well were reduced by eliminating both remedial jobs to cure losses and unnecessary chemicals to build a high mud weight and mud cap to complete the section.

Novel/Additive Information: This application allowed to achieve the objectives of the well and while minimizing the costs of mud chemicals and LCM material. This approach be applied to wells and fields with similar conditions worldwide.