Utilizing MPD technology to Minimize stuck-pipe risk at first and in case stuck-pipe encountered, MPD assists in freeing process hence improving the chances

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Abstract

Maximum initiatives should be taken preventively to minimize the risk of stuck-pipe, mitigating this major drilling hazard. This paper details both preventive techniques to minimize the stuck-pipe risk and corrective MPD application during stuck pipe events, improving the freeing chances. With case study region, actual well case studies, assisting in differential, mechanical stuck and hole pack-off stuck events.

Prevention is always better than cure, so ideally MPD technology should be utilized as a prevention in all wells with formations prone to differential stuck, to minimize the risk of loosing the hole-section. MPD technology utilizes a lighter mud density, hence reducing the extra over balance on the wellbore that creates the high differential pressure causing the differential stuck-pipe. Second preventive aspect is provided by the rotating control device (RCD) of MPD equipment which minimizes the static periods by providing rotation during well control events. Third preventive aspect is for wells with hole-stability issues, MPD provides instant control on bottom hole pressure, holding back the wellbore avoiding hole-pack off.

In any stuck-pipe event, always the quicker the remedial action the better it is. For differentially stuck-pipe MPD provides instant drop in bottomhole pressure by reducing the surface back pressure in a very controlled environment without the need to spot lighter grease pills.

Apart from the routine MPD benefits, if we think out of the box, MPD can play a pivotal role to both prevent and release differential stuck-pipe events. In the case study region around 118 wells utilized MPD with objectives of mitigating differential stuck by utilizing the recommended lighter mud density, hence reducing the extra overbalance creating the high differential pressure. Around 49 wells, RCD was utilized to minimize static periods by providing rotation during well control events. Around 5 wells were drilled utilizing MPD in minimum stress direction with hole stability issues having hole-pack-off risk. During mechanical stuck pipe events, MPD assisted to spot grease/acid pills in a safer convenient manner with MPD maintaining the target bottomhole pressure. The use of lighter mud weight with MPD allowed to go with maximum pumprates clearing filter cake releasing the stuck pipe. At least 2- such events witnessed in the region (graphs in presentation slides) MPD aided in freeing differential stuck pipe events, where the extra overbalance is removed instantly in a very safe and controlled manner. At least 3- such events witnessed in the region. (graphs presented)
MPD technology is used primarily for early kick/loss detection and controlling bottomhole pressure in narrow windows environments. But with extensive successful usage it is now being utilized for unplanned events like stuck-pipe. The competent personnel, sophisticated equipment, were the key factors of the overall success.