Economical Impact of A Dual Gradient Drilling System on Drilling Cost

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Dual Gradient Drilling (DGD) system is a promising technology that was developed to overcome the deep water drilling problems occurred due to narrow operating window between pore pressure and fracture pressure.

In conventional drilling practice, single mud weight exists from drilling unit to TVD (True Vertical Depth) which creates big hydrostatic pressure in bottom hole, moreover, minor changes in mud weight results in big pressure changes proportional to the length of hydrostatic column increase with water depth. On the other hand, DGD allows using two different mud weights to get same bottom hole pressure; low gradient drilling fluid from drilling unit to the sea floor and high gradient drilling fluid form the sea floor to TVD, to decrease the effect of water column on mud hydrostatic pressure in TVD.

In this study, a conventionally drilled deep water well was redesigned considering the DGD system and drilled virtually to determine the changes of cost of services and materials on total operation budget to prove the positive impact of system on total operation cost.

This study not only proved the technical advantages of the DGD system, but also showed economical impact of the system on total drilling cost, by decreasing around 19%.