Drilling oil well design

Engineering

Oil Wells have no specific design, but there are strict standards when it comes to the good design, drilling of the well, and their completion. Typically, oil wells are borings into the earth's surface, which are designed purposely to bring hydrocarbons and petroleum oil to the surface. Various natural resources are obtained alongside petroleum oil, such as natural gas. This paper entails an oil well design. The paper concentrates on the design of an oil well from IPM coursework. From the viewpoint of drilling engineering, aspects such as casing setting points, drilling fluid density, fluid design, and the diameter of hole/casing for every section are considered.

Essentially, Drilling engineers need to design oil wells properly to manage possible intrinsic risks. Drilling programs are also essential in managing and reflecting the pole pressure as well as fracture gradients within the well at any predefined drilling location. Drilling an oil well uses various fluid characteristics depending on the nature of the reservoir. In this case, it is important to analyze and specify the kind of drilling fluid to be used including the type of casing strings to be used as well as their exact number. The casing strings need to be adequate and strong enough in such a way that they can extend from the earth's surface to the well's total depth (National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling). Drilling casing strings and fluids usually work together in order to balance the pole pressure within the rock formation and contain it perfectly without causing any fracture. For an effective oil well design to be created, adequate information about the geology of the surface should be gathered. Information about pressure variations from predictions regarding the actual pores should as well be established. This requirement is a necessity especially in the case of designing the initial well within a completely new

field (Lamb).

Summary

Generally, designing oil wells in done to achieve three key objectives. These objectives include drilling safely, providing a fit-for-use well, and minimizing the overall well cost. Safety, efficiency, and cost minimization are the major drives for a well-designed oil well (Gekengineering. com). These objectives are achieved by observing all design requirements. These requirements include the drilling fluid density for each session and according to the required properties, hole/casing diameters, bit programs, casing properties, mud volume, capacity requirement, annular velocity, and pump requirements (Petroleumonline. com). The exact measurements and calculations are ensured to enhance effectiveness.

Conclusion

Typically, whenever drillers are circulating the fluids through the well, ECD surpasses ESD (National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling). This happens because the force needed to circulate the fluids put forth additional pressure on the designed wellbore. It is thus important to design a mud program when designing the well in order to keep the ESD and ECD below the fracture gradient of the rock. These parameters require close observation. At any given time, it is important to employ redundant barriers. Such barriers would prevent the flowing out of hydrocarbons from the well especially before the main production operations (Lamb). A proper design would be advantageous in both enhancing efficiencies and ensuring safe operations.