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Eliminating Non-Productive Time Associated With Drilling Trouble Zones

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Abstract

Cost overruns can easily manifest during well construction due to unexpected issues including lost returns, differential sticking, and narrow pore pressure/fracture gradients. To better plan for potential overruns, operators sometimes earmark 10 to 25% of the Authorization for Expenditures (AFE) to cover the unexpected, which can significantly impact drilling budgets. Technical and operational risks versus the potential return on investment (ROI) are critical factors in determining whether a project proceeds.

Too often the best drilling practices used to address trouble zones are limited to a few conventional methods with a narrow range of effectiveness. Also, a lack of rock mechanics knowledge can prevent the most efficient solution being applied.

Some operators are implementing planning programs that assess and integrate the latest processes and technologies to address drilling risks up-front. Cutting-edge technologies such as managed pressure drilling methods, drilling with casing / drilling with liners, and solid expandable casing have been highly effective. Implementing proactive evaluation processes and applying the latest tools and techniques can efficiently address operational risks and trouble zones to ultimately reduce NPT and associated costs.

Employing common practices and technologies that are typically ineffective and that drive up NPT cost should be considered unacceptable. Common sense well construction evaluation processes used in conjunction with validated conventional and new technologies have proven their worth by reducing expenditures and risks, preventing the loss of wells, and increasing the operator's ROI.

This paper will review real drilling challenges that have been encountered and the common practices that were employed to address these drilling hazards. This paper will compare and contrast how these same circumstances have and can be addressed much more efficiently with engineering evaluation processes that help determine the best drilling tool and/or technique to mitigate risks and reduce NPT.

Introduction

Wells containing trouble zones come in all forms, shapes, and complexity. Trouble zones lurk in all drilling environments from deepwater wells that require ten casing strings to reach TD to inland wells that only require four casing strings but whose economics limit spending CAPEX and OPEX money to obtain the objectives. Successfully quelling drilling challenges requires combining unique technologies with good practices "honed" through familiarity with the local drilling environment.

Successful construction of wells containing potential or encountered trouble zones depends on accurate analysis of all available well data to deliver the well and its objectives. Often data and learnings from previous well construction attempts within a project are ignored. The next well design is left unchanged and the well is drilled with the same mindset that was used on a previous failed attempt, expecting different results. Although this approach may seem illogicalit has too often been the norm in many offshore environments as proven by the amount of money spent combating known and expected drilling trouble zones.

Maintaining the drilling status quo boils down to habit, an unwillingness to try varied design philosophies or drilling practices, or the reluctance to implement new or under-utilized technologies. With the state of technology, the tired cliche of "that's the way it has always been done" no longer passes as a plausible excuse. In an up market, maintaining ten to 20 percent contingency fund within a well's AFE has been rationalized as a "standard" well construction practice. However, a leaner economic market calls for a ten to 20 percent improvement in drilling efficiencies to prevent many good prospects