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Foothills Drilling Performance Improvement – A New Transversal Approach

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Abstract

Total E&P initiated a drilling campaign in 2018 near the foothills of Bolivia where wells can be extremely challenging and lengthy to drill. These wells mandate exhaustive planning due to the geological complexity and abrasive environment prone to severe wellbore instability. Through a unique and collaborative approach of competitive service companies, engineering resources were combined and leveraged to identify and mitigate risks of wellbore instability, losses and drilling dysfunctions. Combining service companies' resources and knowledge allowed to set up a new transversal approach to challenge old paradigms and implement new drilling tools (directional drilling and bits) adapted to this environment.

The present paper reflects the approach taken to solve these technical challenges: Adaptation of new drilling technologies based on local experience with downhole tools. New fluids strategy based on operator's knowledge/experience with transversal geology and geomechanics interactions. Rate of Penetration (ROP) improvement roadmap based on data analysis and engineering implemented through the processing of offset wells drilling data, real-time monitoring of Mechanical Specific Energy (MSE) and drilling dysfunctions avoidance. Team spirit-based approach where all actors of the execution embarked on board.

As a result, the first well was finished ahead of the projected authority for expenditure (AFE) (87 days) without technical or geological sidetracks (which are common in the Bolivian foothills due to the geological complexity). Overall ROP was improved in most sections of the well and considerably less bottom hole assemblies (BHA) trips were required to complete the well. Wellbore quality improved in comparison with offset wells with less overgauge (OVG) and tortuosity. Customization of downhole tools for specific hard-abrasive-intercalated formations in foothills along with optimum drilling parameters were critical to achieve this success and is discussed in this paper.

Thanks to this new transversal approach and unique collaboration among all the competitive service companies, an overall reduction of drilling dysfunctions was achieved. Optimization efforts were successfully implemented by following a roadmap which focused on mitigating dysfunctions based on MSE and lithology. All this was possible through the creation of spaces and opportunities for open dialogue with contractors and service companies (training, meetings, workshops, debates) and information exchange with proper documentation, action planning, follow up and debriefings, valuing ideas, embarking everyone and encouraging to avoid silo thinking by taking care of good integration and interfaces.

