ABSTRACT
Coiled tubing is commonly used as an intervention tool for treatment delivery in long horizontal wells. As with any intervention tool, however, coiled tubing has operational limitations. Depending on the diameter of the horizontal sections and the well trajectory, accessing laterals greater than 1,000 m is often problematic or not possible due to helical friction lock-up. The well profiles in Vankor, a new frontier oil and gas field in East Siberia, are designed with a reverse bend in it allowing the horizontal section of more than 1,000 m the wellbore to be directly beneath the wellhead. There is an 800 m thick layer of perma-frost which is coupled with extremely low reservoir temperatures that complicates the intervention causing the wax precipitation in tubing.

Conventionally, it is possible to change the geometry of the intervention (CT OD), optimize the string design, utilize lubricants (metal to metal friction reducers), straighten the coiled tubing string, use downhole tractors and vibration tools. The use of different methods yields incremental reach of 5 – 20% in some cases. This paper highlights an approach that has been implemented in Vankor field to enable the coiled tubing intervention to access the horizontal lateral with the methods of string design optimization and utilization of downhole BHA vibration.

The coiled tubing string design requires the special attention for successful intervention in horizontal and extended reach wells. The optimized tapered string allows increasing the advance of coiled tubing to 5-15% compared to traditional design.

The vibrator tool can effectively increase CT access to the extended reach hole by reducing the implied friction coefficient of the wellbore up to additional 10 %. The tool is actually delaying the helical shape and reducing the number of coiled tubing contact points dragging on the well bore.

This paper reviews the engineering and operational challenges related to utilizing coiled tubing in Vankor field and the solutions required to overcome these issues.

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