Evolution of Coil Tubing Drilling (CTD) Unlocks Additional Resources at the Kuparuk Field, North Slope, Alaska

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Kuparuk Field is a combination structural-stratigraphic trap with over 6 BSTB of original oil-in-place that produces from two main reservoir zones (Kuparuk A and C). Reservoir properties differ between the two zones with the Kuparuk C being generally thicker and having higher porosities and permeabilities, but production has been co-mingled since field start-up in 1981. Both zones are highly faulted with over 6000 mapped faults in the field and many isolated fault blocks, often with high differential pressures. Compartmentalization, coupled with hydraulic competition between the A and C, has limited the effectiveness of the original line-drive water flood design, particularly in the A sand, and led to the need for a targeted infill development campaign. Despite a steep learning curve, Coil Tubing Drilling (CTD) has now been proven to be a successful infill technique at Kuparuk Field. A combination of factors including solutions to early drilling challenges, new steering and formation evaluation tools, and the acquisition of 4D seismic data has improved our ability to deliver effective infill wells with CTD. We are now able to drill laterals up to 3500' long, wells with up to 5 contributing laterals, and to target multiple isolated fault blocks from a single "parent" rotary well. These advancements have led to a full-time, purpose-built CTD rig at Kuparuk and delivery of an infill program able to access poorly-drained or un-swept areas at much lower development costs than conventional rotary sidetracks.