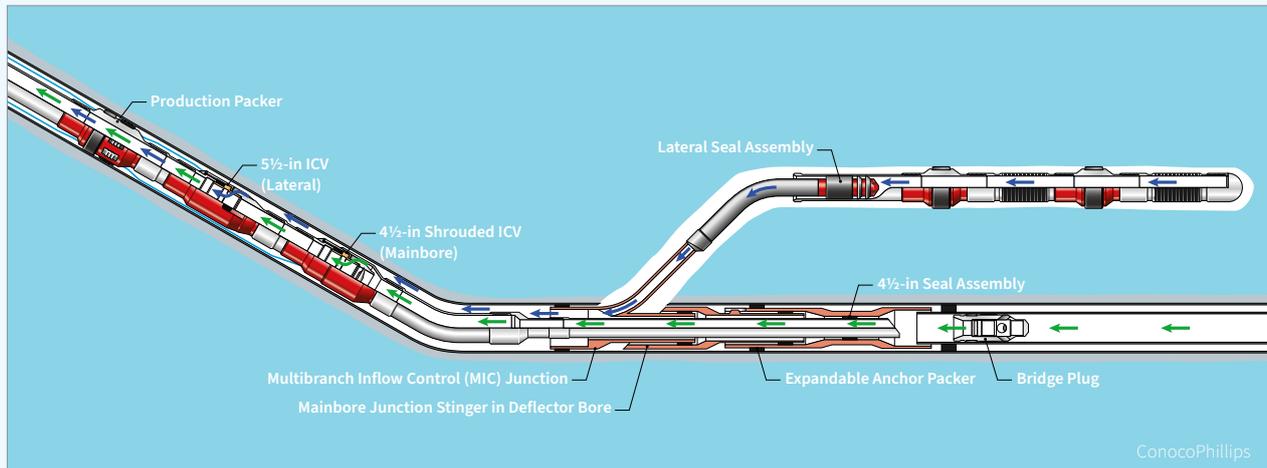


## RETROFIT MLT AND TROUGH TUBING DRILLING -TTD



Retrofit Multilaterals RMLT and TTD Through Tubing Drilling are technologies allowing added, low cost, drainage or injection points from existing wells. While maintaining access to production or injection from the existing well bore these methods are converting single bore wells to dual or multiple lateral wells.

The savings related to TTD is to avoid removing and reinstalling the completion string and no drilling of top-holes sections. For Retrofit it is improved slot usage, reduced drilling of top-hole sections and keeping the x-mas tree installed throughout the drilling process. Both technologies offer access to smaller targets which may not be viable by drilling single dedicated wellbores, or from a sidetrack when the old wellbore is shut off and remaining production is abandoned. Both technologies increase the recovery and may extend the platform life.

Maintaining the access and production or injection from the main bore is crucial, and the development of the hollow or removeable whipstock has been the major breakthrough to enable the technology. Several operators have used the technology on the Norwegian Shelf, and there are ongoing developments to further refine and optimize both technologies.