Extending Field Life: A Case Study from the BBT Field, Tunisia

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Abstract

The BBT structure was first drilled in 1959 by the TT-1 well which was targeting the Triassic and Devonian. The BBT field was eventually discovered in 2008, by the drilling of the TT-2 well, which was targeting Middle - Late Ordovician by-passed pay. Today, a total of 24 wells have been drilled into the field which produces 44° API light oil from the tight, Ordovician age, Bir Ben Tartar (BBT) and Jeffara Formations under solution gas drive, without any injection support due to the low reservoir permeability. Current production is approximately 520 bopd from 18 wells, all with hydraulic stimulation and with most wells flowing via artificial lift, either Sucker Rod Pumps or Jet Pumps. ATOG acquired the field and the operatorship in 2019 and embarked on a program of activity to extend field life. The field has been in natural decline since 2015 with the last development well drilled by the initial operator STORM in 2014. Work initially focused on the re-evaluation of the available 3D seismic and the definition of a new layering subdivision to better reflect the production behavior of the reservoir, especially after hydraulic stimulation operations. Integration of this work identified a number of potential new infill well locations which were selected by taking into account estimated remaining volumes, reservoir uncertainty, structural location, reservoir pressure, distance from existing wells and cost of operations. The new subsurface model improved the history matching of the existing wells, updated the STOIIP and provided a forecast on remaining reserves that could be expected from the new infill well locations. The new wells are expected to provide new incremental oil volumes and provide calibration for future wells. A second phase of work focused on the evaluation of all the existing production wells in order to identify opportunities for production optimisation to further extend field life. These activities have been ranked in terms of cost, incremental production gain and risk with the goal to execute the best opportunities first. The identified opportunities include the installation of artificial lift in naturally producing wells, artificial lift conversions and artificial lift re-design which will provide better production uptimes and manage high gas production and/or sand production. The work undertaken has identified a number of opportunities that will raise the base case production profile, extend the life of the BBT field, defer an expensive field abandonment program and provide additional revenue.