

Tawke Field, Kurdistan – Producing a Giant Naturally Fractured Carbonate Reservoir

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ABSTRACT

The Tawke field was discovered in 2004, and has more than 750 million barrels in reserves in two reservoir intervals, of which only a fraction has been produced. Currently the field has been developed with 20 production wells, and has reached a production rate of approximately 100kbopd. This is possible due to highly fractured reservoir intervals and favourable oil properties.

The field has been developed with mainly vertical wells, each producing from one or more fracture systems intersecting the well. Identifying the fracture orientation and intensity is one of the key success criteria for increased production rates through improved well design. This has been addressed with electric wireline logging and seismic attribute mapping. The field is well connected both laterally and vertically, and only a few areas suffer from poor reservoir properties and low connectivity.

The production strategy is to produce the wells at a low water cut and limited draw down, to avoid bypassing of oil and maximize recovery. This strategy is based on reservoir simulation, production history, analogue studies and analytical models. In practice, this means choking back wells to maintain a low water cut, and in addition some wells have been plugged back to produce higher on the structure. Water production is carefully monitored through regular testing and surveillance of the well performance through a series of structured reviews. Currently all the wells are being connected by wireless connection to the control room, allowing continuous monitoring of rate, pressure and temperature, as well as choke control. This will not only reduce the risk of water production, but also allow for more proactive field optimization.

The Tawke field is aspiring to reach a plateau rate of approximately 200 kbopd. This can be made possible by introducing new wells orientated to intersect the most conductive fractures. At the same time, DNO is developing a real-time surveillance environment, allowing the extended production team to monitor and analyze well performance on the go.

All the way from detailed subsurface modeling to advanced surveillance technology, DNO aim to develop the Tawke field as a showcase for modern field development of naturally fractured reservoirs in the Middle East.”