

Case Study

StackFRAC system revives non-producing open hole horizontal wells

INTERNATIONAL, KUWAIT
STACKFRAC HD SYSTEM

Background

Open hole horizontal wells have become more prevalent in Middle East carbonate reservoirs for their increased reservoir contact, higher production rates and improved access to reserves. Stimulation of these wells can be challenging due to poor and inconsistent acid distribution, especially in heterogeneous reservoirs with variable permeability along the wellbore.



Challenge

The Operator had two open hole horizontal wells in carbonate fields that had stopped producing due to formation damage and incomplete cleanup. The first was in the Mauddud limestone formation in the Sabriyah field. It initially produced at 2,000 BOPD, but shortly after being put on line it stopped producing due to collapse of a shale section. The second well was also in the Mauddud in the Greater Burgan field. It initially produced at 2,070 BOPD, but ceased to flow shortly after connecting it to the gathering centre due to hole collapse as well as poor reservoir quality.

The challenge was to find a method to effectively stimulate the entire horizontal wellbore. The Operator asked Packers Plus to design a multi-stage fracturing system to see if these

wells could be revived.

Solution

For the Sabriyah well, a 6-stage Packers Plus StackFRAC® system was designed based on permeability contrast, and the stimulation treatment design included emulsion acid to achieve deep penetration and viscoelastic acid for chemical diversion.

The second well was divided into seven stages based on formation evaluation. The section suspected of having wellbore stability issues was isolated with blank pipe and left untreated. A total 5,635 bbl of stimulation fluids were pumped at a rate of 30 bpm to prevent uncontrolled fracture growth into nearby layers.

Results

After treatment, the Sabriyah well was immediately flowed back and produced 100% crude within two hours. The production rate was over 10,000 BOPD, 5 times the field average and 3 times the best well in the field. This well was the first to ever be completed with a multi-stage fracturing system in Kuwait. Two years after treatment, an Electric Submersible Pump (ESP) was installed with a production rate of 3,028 BOPD due to a lack of reservoir pressure support.

The initial postfracture production of the Burgan well was 3,827 BOPD, more than twice the best producer in the same area and significantly higher than the average 1,127 BOPD for horizontals in this field.

The success of these and a third well in the Mishrif limestone formation in the Minagish field (220 BOPD to 4,788 BOPD after multi-stage fracture stimulation) has the Operator looking to apply this successful technique to many of their open hole carbonate horizontal wells that are currently shut-in due to poor performance.

