Operator wanted to increase production, eliminate screenouts in complex fields

The Qarun Petroleum Company operates several wells in the Western Egyptian Desert. Because of low permeability, most wells in this area cannot be produced commercially without stimulation. Previous attempts to stimulate wells in this region produced mixed results, with reduced fracture conductivity and an average screenout rate of more than 8%. The screenouts required lengthy and expensive workovers, resulting in reduced retained fracture conductivity.

Schlumberger combined engineered fracturing technologies to treat wells

The operator turned to Schlumberger to help overcome the challenges in these fields and increase production. Schlumberger recommended HiWAY flow-channel hydraulic fracturing technique, which had been applied in Egypt more than 90 times with no screenouts. The HiWAY technique significantly increases fracture conductivity while reducing water and proppant production. Instead of flowing through the proppant in the pack, hydrocarbons flow through stable channels, increasing conductivity to the tip of the fracture. This technique enables longer effective fracture half-length, provides a more effective contact area, better fluid and polymer recovery, and minimizes fracture face damage.

Schlumberger also used RodPROP high-aspect-ratio proppant in the treatment of these wells. RodPROP proppant provides up to three times higher fracture conductivity than conventional proppants, improving well performance. The unconventional shape of the RodPROP proppant creates a unique, consolidated proppant pack that is resistant to the forces that cause proppant flowback. It also provides better cleanup after treatments, resulting in higher retained fracture conductivity than conventional proppant.

CASE STUDY

Unique Stimulation Combination Increases Long-Term Production 199% in Western Egyptian Desert

Channel fracturing and rod-shaped proppant improve production and eliminate screenouts in more than 90 stimulation stages to date

CHALLENGE

Increase production and eliminate screenouts during the treatment of mature oil fields in Egypt’s Western Desert. These complex fields produced only marginal results with traditional hydraulic fracturing. Previous fracturing designs and pumping techniques increased the risk of premature screenouts.

SOLUTION

Stimulated targeted wells with the HiWAY* flow-channel hydraulic fracturing technique combined with RodPROP* high-aspect-ratio proppant.

RESULTS

More than 20 wells have successfully been treated in five different fields for the operator, resulting in higher production, zero screenouts and no proppant flowback. A comparison study of seven wells using the HiWAY fracturing technique and conventionally treated wells showed an 89% initial production increase and 199% long-term production increase.

Production analysis of all fields in this study reveal that the HiWAY channel fracturing technique increases both short- and long-term production in the Egyptian Western Desert.
CASE STUDY: Channel fracturing and rod-shaped proppant improve more than 20 wells in Western Egyptian Desert

Average daily oil production of HiWAY wells versus offset conventional wells.

HiWAY technique increased production, outpaced conventional fracturing methods

Schlumberger successfully used the combination of the HiWAY flow-channel hydraulic fracturing technique and the RodPROP high-aspect-ratio proppant to treat more than 20 wells for Qarun Petroleum Company. In a comparison study, wells treated with the HiWAY technique showed an increase in production of 89% versus conventionally treated wells. Long-term production showed an increase of 199%. On average, the HiWAY wells performed 19% better than wells treated conventionally.

In addition, the wells treated with the HiWAY flow-channel hydraulic fracturing technique had an impressive screenout rate of zero, compared to a typical screenout rate of 5% to 10% for conventional treatments in these fields. The use of the HiWAY technique also reduced the amount of proppant and fluids used compared with conventionally fractured wells—saving money and reducing environmental footprint.

After the successful treatment and impressive results, the Qarun Petroleum Company plans to use the HiWAY technique in many of its wells in this region. In fact, the HiWAY technique has already been used to fracture two injector wells and refracture a well where conventional fracturing treatments had previously resulted in screenouts.