CHALLENGE
Identify the production potential of an under-estimated, artificially lifted well to optimize recovery.

SOLUTION
Use Advanced Lifting Services powered by LiftWatcher* real-time surveillance service and control system and LiftPro* well optimization service to analyze and determine reservoir potential and to recommend an electric submersible pump (ESP) completion that would achieve the predicted production potential.

RESULTS
Achieved predicted production increase of nearly double, to 11,200 bbl/d from 6,200 bbl/d, and at the same time decreased water cut.

The success of this well and the ESP redesign prompted GUPCO to repeat the same process in similar wells in this field in Egypt’s Western Desert.

An underestimated well in the Western Desert
When production from a naturally producing well in the Western Desert of Egypt dropped from 2,300 bbl/d to 980 bbl/d because of high water cut, Gulf of Suez Petroleum Company (GUPCO) installed a REDA* ESP system to improve production. The system was designed to produce between 5,000 bbl/d and 6,000 bbl/d, based on an initial productivity index (PI) of 32 bbl/d/psi. After installing the ESP in the 235- to 245-ft-thick carbonate-and-shale North Razzak field, the well began steadily producing at 6,250 bbl/d with an average water cut of 89%. After a few months, the well failed electrically because of chemical corrosion to the power cable caused by CO₂. When the well was worked over, the LiftWatcher service for ESPs was installed along with a variable speed drive (VSD) to further optimize the well.

Real-time monitoring and a new ESP plan
The LiftWatcher system, which provides real-time performance diagnosis of producing wells and enables monitoring of sandface property and formation integrity changes, was critical to maximizing production. The LiftPro service, which combines artificial lift and well-testing expertise with advanced well diagnostic tools, was used to predict the well’s production capacity. The Schlumberger team used Advanced Lifting Services deployed from the Artificial Lift Surveillance Center (ALSC) in Egypt, to perform surveillance on the underperforming well, analyze data, and track well test results. These
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After the new ESP system was installed, production from the well increased as expected, to a rate of 11,200 bbl/d. In addition, water cut decreased by 3% even after the increase in the production rate. The success of this well and the ESP redesign prompted GUPCO to repeat the same process in similar wells in the field.

Continuous real-time monitoring and matching showed a production index (PI) of 102 bbl/psi/d, well inflow capabilities that were much higher than expected. Production rate and downhole flowing pressure data points were collected and plotted against time, and an inflow performance relationship (IPR) curve was constructed. GUPCO and the Schlumberger Advanced Lifting Services team decided to adjust the targeted production rate to between 10,000 bbl/d and 12,000 bbl/d. The team then recommended a higher capacity ESP with a flow rate capacity from 8,000 bbl/d to 14,000 bbl/d to cover the range of uncertainty.

After a LiftPro analysis, the well was determined to have three times more production potential than was originally predicted.