

Case study: Italy

# Comprehensive approach to ESP management proved successful, increased run life, production rate

A customer with existing wells in a natural park suffering from severe water cut wanted to install electrical submersible pumps (ESP) while completing a sidetrack operation. The well location necessitated the customer to minimize workover operations to restore production. ESPs are the preferred artificial lift solution to assist oil production from wells in depleted areas or where high back-pressure is required by surface flow line length and elevation. Regulations required a production packer as a barrier in the well. The reservoir is known for asphaltenes and scale deposition. With these combined factors, the customer approached Baker Hughes for an integrated solution.

Baker Hughes recommended the **FLEXPump™ series multistage centrifugal pumps**, which have the industry's highest efficiency and widest operating range, providing the operational flexibility required in dynamic well conditions. The advanced engineering hydraulic designs of the pump stages maximize production while extending ESP run life.

For this specific operation, the stabilized extreme duty FLEXPump80 pump was ideal for the abrasive downhole conditions, preventing radial wear and coping with down-thrust in the later well lifecycle. Metal bellows and service-less seal sections will allow operator to perform routine treatments for asphaltenes removal, ultimately increasing well production.

In addition, Baker Hughes suggested the **ProductionLink™ Expert artificial lift monitoring service** to provide real-time monitoring of ESP to optimize production. With an integrated field connectivity, the solution brings wellsite data to the customer through a secure web-based interface that enables early detection of degrading conditions, minimizes health, safety and environmental (HSE) risks (requiring fewer trips to the field), reduces intervention costs and downtime, and maximizes equipment run life.

The completion was built around the **ElecPaK™ electric submersible pump packer**, a dual-string completion that carries the ESP system on a Y-tool to allow access to lower formations for stimulation. The ESP was equipped with two chemical-injection valves/lines at the intake. The packer operates on pull-to-retrieve mechanics, minimizing rig time and trips in the next well workover.

Baker Hughes field personnel flawlessly deployed the combined solution into the wellbore. After the workover, the well was put on a natural flow yet, after a few weeks, the well productivity index (PI) started to decline. The ESP was made operational to increase and maintain production, ultimately yielding a 30% production increase.

With the ESP installed directly after the sidetrack, the customer avoided the workover costs needed to install the ESP in a second phase, also saving differed production. A total of 12 hours of rig time was saved through service-

## Challenges

- Overcome unique downhole issues:
  - High uncertainty well parameters with a new sidetrack
  - Scale and asphaltenes deposition tendency
  - Casing ovalization required new ESP setting depth capable of handling gassy conditions
- Increase production
- Reduce lifting cost
- Avoid extra workover by installing the ESP after sidetrack

## Results

- Extended ESP run life through a comprehensive solution to ESP management
- Eliminated ESP change-out, an estimated \$1 million USD
- Avoided unplanned workover costs by preventing asphaltenes and/or scale deposition, an estimated workover cost of \$3 million
- Increased well production by allowing perform acid/solvent jobs below the ESP
- Realized an incremental oil production increase of 30%, an estimated \$80,000 per day
- Experienced no HSE issues or nonproductive time (NPT)

less seals and a pre-assembled sensor-to-motor connection. The risk of unplanned workover activities was reduced with the utilization of a field-proven ESP design. The high efficiency FLEX80 pump will reduce lifting costs up to 55%.

The Baker Hughes solution and experience mitigated the severe asphaltene deposits while managing well uncertainties. The reliability of the ESP system was demonstrated with the excellent run life in the field while minimizing for unplanned workovers. In addition, the proactive engagement between the customer and Baker Hughes resulted in an excellent collaboration despite the widespread outbreak of COVID-19 in Italy, generating a new comprehensive approach in the ESP management.