

SlimLine ESPs Revived Four Shut-down Wells, Averaged 2,950 BPD Production in 5½-in. Casing

CHALLENGE

Bring shut-down wells with ODs of 5 in. and 5½ in. back on production with ESP systems.

SOLUTION

Install SlimLine ESPs with permanent magnet motors and standard induction motors.

RESULTS

- Revived four wells to generate an estimated 1.5 million barrels of oil and \$45 million USD in revenue over 531 days
- Reliably produced between 2,000 and 4,000 BPD out of four wells with casing sizes of 5 and 5½ in.

Four Down Wells

An operator in the Middle East had four wells that were shut down and not producing. They all had 5- or 5½-in. (127- or 140-mm) casing with expected production rates ranging between 2,500 and 4,000 BPD (400 and 635 m³/d). Given the high production rates and relatively small casing sizes, there simply were no available electrical submersible pumping (ESP) systems available in the market that could handle the job. The operator was losing money on the wells and they were looking for a way to put them back on production.

The Solution

Novomet approached the operator with a solution for getting their wells back online using our SlimLine ESP systems. SlimLine ESPs are designed specifically to produce large fluid volumes reliably in wells with smaller casing sizes. Having no other competing ESPs capable of producing at the rates the operator desired on these wells, they gave us the go-ahead to install the SlimLine systems.

Well 1

The first well had 5-in. casing with a target production rate of 1,800 BPD (285 m³/d). No other ESP that fits inside 5-in. casing is capable of producing this volume of fluid. We installed a 319-series SlimLine ESP at 4,147 ft (1264 m)—powered by a permanent



SlimLine ESPs revived four shut-down wells, producing between 2,000 and 4,000 BPD in 5-in. and 5½-in. casing. The production yielded an estimated \$45 million USD in hydrocarbons that would otherwise have been left behind.

Middle East

magnet motor—which has an outside diameter of 3.19 in. (81 mm). This highly efficient, slim system provided enough clearance between the ESP and the inside diameter of the 5-in. casing to pump the desired flow rate. The well went from producing 0 BPD to the target of 1,800 BPD as soon as we turned the system on. It has been running for 322 days and counting.

Well 2

This well had 5½-in. casing and was underproducing at 1,300 BPD (200 m³/d) with a progressive cavity pumping (PCP) system. When the PCP went down, the operator decided not to use another PCP because of the poor production rates. They had shut the well down until a better solution could be found.

After looking at the well parameters, Novomet installed a 406-series SlimLine ESP string at 4,000 ft (1220 m)—powered by a permanent magnet motor—with a special wellhead designed to produce the targeted range of 4000–5,000 BPD (635–795 m³/d). The well has yielded the target production range for 714 days and counting.

Well 3

With a target production rate of 3,500 BPD (550 m³/d), the operator had been unable to find an ESP that would work in the 5.5-in. casing in this well. Novomet installed a 362-series pump with a larger 406-series standard induction motor. The standard induction motor

was used in place of the more efficient permanent magnet motor because it could be installed without a discharge control line, helping lower the string more smoothly and produce the required 3,500 BPD. We installed this modified SlimLine ESP at 7,500 ft (2285 m), where it has produced for 448 days and counting.

Well 4

Well 4 was a bit different than the other installations. This well had been producing for almost 10 years with a competitor's 338-series ESP. The pump on the old system used 660 stages to generate the thrust necessary to produce 2,000 BPD (320 m³/d). When it failed, the competitor was unable to replace the system.

Novomet installed a 362-series SlimLine ESP with a permanent magnet motor running at 70 hz. At this frequency, the system generated 2,000 BPD with just 229 stages (compared to the competitor's 660 stages) and drastically reduced power consumption. This system has produced the target production rate for 643 days and counting.

Results

With no other equipment capable of producing these four wells, our SlimLine ESP systems averaged 2,950 BPD (470 m³/d) for an average of 531 days per system and counting, adding roughly 1.5 million barrels of oil that the operator would not otherwise have been able to produce from these wells. Assuming \$30 USD per barrel, that's an additional \$45 million USD in production from what were four non-producing wells.