

# Dual-ESP Completion Accelerates Oil Production in Stacked Reservoir for OMV

Engineered ESP technology adds production monitoring and long-term flexibility for changing reservoir conditions, Austria

## CHALLENGE

Accelerate oil production from stacked reservoirs with significantly different pressure profiles.

## SOLUTION

Install a dual-ESP completion with one ESP per reservoir layer.

## RESULTS

- Improved oil production by commingling flow from both layers without detrimental crossflow effects.
- Improved reservoir knowledge by enabling production monitoring for each layer.

**“The idea of accelerating production and saving a development well in the latest drilling campaign was realized by applying a dual-ESP system for commingled production.”**

M. Hoy, T. Florian, and H. Geier  
OMV Austria E&P  
in SPE 182908



## Improve production by commingling flow from two layers

OMV Austria E&P GmbH operates a number of wells that produce from a series of stacked reservoirs in the Erdpress field, Vienna basin. The layers differ substantially in pressure profile, inducing crossflow and reducing production if commingled and produced simultaneously. Consequently, the company produced each layer with a dedicated well, then recompleted a different layer, repeating the process until the layers were produced to their economic limits.

To accelerate production, OMV considered several options for producing two layers at once. Gas lift was eliminated because the field does not have the required gas supply. Another option, producing with dual sucker rod pumps, was also eliminated. If the pumps used a single rod, it would be impossible to optimize plungers for each layer and maintain optimal operation as reservoir conditions changed. Using two rods in parallel could achieve the necessary flexibility, but the resulting completion would be too complex.

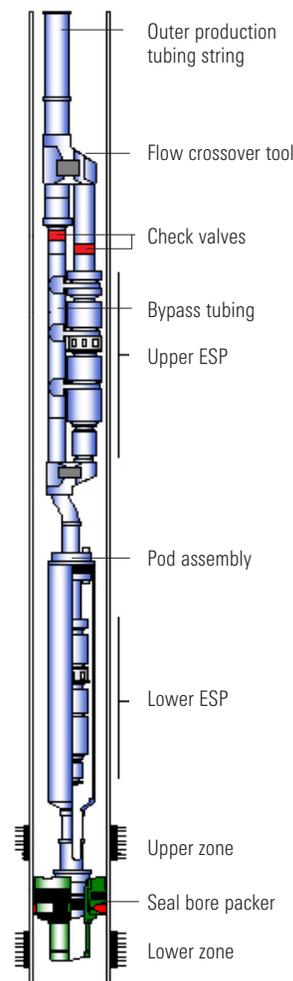
## Control both layers with a dual-ESP completion

Schlumberger proposed a dual-ESP completion to control each ESP and layer while enabling commingled production. The proposed completion comprised a lower ESP system encapsulated in a pod and an upper ESP system with a motor shroud and a bypass system. A series of valves would prevent cross flow. The whole string would be stabbed into a packer between the two reservoir layers. This design placed the entire dual-ESP string above the packer, facilitating future workovers, compared with having one ESP below the packer.

## Meet production target for both layers

The first dual-ESP system was engineered for the Erdpress-6 well. The upper reservoir had higher productivity index (PI) and pressure as compared with the lower reservoir, so the lower ESP system was designed with more stages than the upper. Target production rates were set to 280 bbl/d of fluid for each layer to avoid sand production and early water and gas breakthrough. Each pump was designed to accommodate a wide production range (250–1,400 bbl/d of fluid at 50 Hz). Tubing movement analysis was performed to ensure that tensile stress at the wellhead and compressive forces downhole were kept within the material limits at all stages of the completion life. Both pumps were also equipped with sensors to facilitate allocation calculations and enable ESP surveillance.

Each zone was initially produced separately to optimize pump performance. When the fluid was commingled, the initial flow rate exceeded the desired rates by more than 25%. After recalculating allocations from each layer, pump frequencies were revised, so the upper zone contributed 60% of the oil and the lower zone 40%.



*A dual-ESP completion accelerated production from an Austrian well by commingling production from two reservoirs with significantly different pressure characteristics. Check valves, shown in red, are essential to prevent cross flow.*