

Development Concept of the Hot Water Development project in the Oilfield Emlichheim

S. Künckeler, H. Beckmann, D. Prasno

Wintershall Dea Deutschland GmbH, Hamburg, Germany

The Emlichheim oil field is an oil reservoir near the municipality of Emlichheim in the county of Bentheim. The field has been officially in operation since May 1944.

Currently the tertiary recovery for oil in Emlichheim is achieved via high pressure steam injection. The steam is generated in boilers and a combined heat and power unit (CHP). Both are fired with associated and natural gas. The generation of steam causes high specific CO₂ emissions. These emissions are yet not in line with Wintershall Dea's commitment of net zero GHG emissions from production by 2030 and the goal to reduce emissions by 25% in 2025. Furthermore, the current production technique leads to high specific OPEX mainly due to the need for gas powered steam generation and consequently CO₂ emission certificates. Prices for both are forecasted to rise in the coming years. Additionally, the European legislation imposes lower emission limits for SOX emissions from 2025 onwards (national regulation 44. BImSchV). To continue economic production in Emlichheim a desulphurization unit is required to meet the emission limits.

The Hot Water Development (HWD) project caters for CO₂ emissions reduction, reduction of OPEX and compliance with SOX emission limits while ensuring continuous production and economic resilience.

The HWD provides heat to the most prolific areas of the reservoir through 3 hot water injection wells. It produces from 5 new production wells and from 4 geological side-tracks. The existing facilities will be partially decommissioned and simplified and a hot water generation unit will be installed. The HWD utilizes the in any case produced associated gas and until 2030 additional natural gas to generate hot water. From 2024 to 2025 the HWD will reduce annual CO₂ emissions by approximately 80% and from 2030 onwards by another 71%.

Furthermore, only produced water will be used for the HWD. The fresh water consumption compared to steam generation will be reduced, which is another important Key Environmental Performance Indicators (KEPI) in sustainability.

Finally, any CO₂ neutral heat source, such as geothermal can be used to generate additional hot water beyond 2029 (topic covered in presentation 'Case Study "Zechstein Geothermal Water"' by Florian Schroers). This is a further upside to extending the field recovery through HWD. The desulphurization unit will remove the H₂S from the associated gas to meet the emission limits set by the 44. BImSchV.

All these improvements ensure that Emlichheim keeps producing in line with the regulatory requirements and our own targets in terms of sustainability.

The presentation shows the overall development plan for the HWD project, and will give an insight into the reservoir simulation sensitivities done to achieve this concept.