Implementation of the Gas Cap Utilization Concept of the 16.TH as Peak Underground Gas Storage

D. Zabel[1], N. Baric[1], S. Kreiger[2]
[1]OMV Aut E&P GmbH, Subsurface Engineering Austria, Gänserndorf, Austria, [2]OMV Gas Storage GmbH, Technical Asset Management, Wien, Austria

The 16th TH is the most important of the stacked reservoirs in the Matzen field located in Vienna basin. It is an up to 70m thick blocky transgressive sandstone with excellent porosity and permeability, characterized by thin hard layers that are important vertical barriers for liquid and gas flow. While it was discovered in 1949, it is still the largest oil producing reservoir in Austria. Water injection for pressure maintenance started in 1968 with voidage replacement ratio (VRR) in 2023 of around 0.64.

First ideas to use the central initial gas cap of 16th TH reservoir for gas storage while simultaneously producing oil date back to 1994. Since then, several development concepts were prepared, simulation studies run and injection trials made. However, due to various reasons, the project was never rolled out and no commercial gas storage operations went on stream in this reservoir.

Due to geopolitical reasons, demand for gas storage capacities rapidly rose in 2022 in Austria and across all of Europe. Multiple factors led to a record filling level of OMV's Austrian gas storage facilities of up to 107% in 2022. Due to the supply uncertainties on the European gas markets and the continuous demand for gas storage capacities, the utilization of the additional storage capacity of the 16th TH with the existing surface facility was revisited.

This paper describes the necessary surface and subsurface work done to include the 16th TH into the existing gas storage infrastructure of OMV Austria. This includes inspecting and re-connecting pipelines, refitting a collector, repurposing an existing well from gas production to gas storage, development of operational modes to inject gas via the existing surface facility, examining the heterogeneous gas- oil- contact, setting up a monitoring concept for the production behavior of adjacent oil producers, analyzing the movement of the gas- oil- contact and quantifying the effect on oil production.

It describes how an additional storage volume of up to 100 Mio. m³(Vn) was obtained by utilization of a single well, which is centrally located in the middle of the gas cap. The project was kicked- off in March 2023, resulting in first commercial gas injection in August 2023.

After injection of 45 milion m³(Vn) gas by the end of 2023, a few oil producing wells needed to be shut in due to an increase of gas- oil- ratio. While reservoir pressure rose by ~3,5 bar in the near-wellbore area of the newly utilized gas storage well, the decline in oil production of the whole reservoir seems to have reduced. Reduction of watercut could be observed on some wells. Thus, the ambition to maximize ultimate recovery of the oil phase while utilizing the gas cap for storage seems within reach.

Further plans include close monitoring and surveillance of the 110 active wells of the 16th TH reservoir. In addition, it is planned to conduct a workover on the operating gas injection well to reduce skin and increase productivity and injectivity.