Oil and Gas Occurrences of the Vienna Basin

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The oil- and gas provinces of the Vienna Basin (FRIEDL, 1957; KRÖLL, 1980; LADWEIN, F. SCHMIDT, SEIFERT & G. WESSELY, 1991, BRIX & SCHULTZ 1993) are connected to distinct structural features. A concentration occurs over the depocenter of deeply buried autochthonous Malmian marls below the northern Vienna Basin.

The structural trapping features are the large fault systems of the northern Vienna Basin in Austria, in particular the Steinberg Fault system, the median highzones of Matzen - Aderklaa - Enzersdorf including the Preneogene Calcareous Alpine floor, and the southern and southeastern fault systems.

The northern and central provinces contain oil and gas of thermocatalytic origin. Gas of biogenic and mixed origin was found in the southern and southeastern regions.

Lower and Middle Miocene transgressive and regressive sandstone cycles resulted in a stack of multiple productive zones (KREUTZER, 1986). As a result nearly every field in the Neogene floor produces from several horizons. At Matzen field, for example, at least 9 Lower Miocene, 16 Badenian, 9 Sarmatian and 4 Lower Pannonian horizons contain hydrocarbons. The best productive zone is the transgressive 16th Badenian horizon in the Matzen field.

The trapping mechanism is primarily structural. Tilting along flanks of structures also causes combined stratigraphic and structural traps, particularly in the Lower Miocene.

Along the faulted zones, accumulations of hydrocarbons have been found in parallel striking, often rather narrow faultblocks. Along the downthrown block complex of the Steinberg Fault, classical drag- and rollover structures have been found. The rollover structures have downfaulted crests in some cases. In the upthrown block anticlines cause trapping. Along the median highzones, traps are extended anticlines, such as at Matzen, Aderklaa and Zwerndorf.

The Flysch Zone below the Neogene is only productive in the area of the Steinberg High and neighbouring structures. Like the Neogene, it has multiple productive zones in Paleocene to Eocene turbiditic sandstones.

The oil- and gas fields of the Calcareous-Alpine floor of the Vienna Basin are mainly situated along the median highzones. The reservoirs are thick Upper Triassic dolomites (Hauptdolomit) and, in one case, dolomitic limestones (Dachstein Limestone). The hydrocarbons are trapped in flat to very steep dipping structures. In the latter case, vertical gas columns of several hundred meters occur, as in the Schönkirchen area.

Two types of traps can be distinguished: relief and internal. In the first, Neogene marls act as a caprock, whereas for the second, tight sediments within the Calc Alpine complex (for example Cretaceous to Paleocene shales and sandstones) unconformably cover the dolomites. The Schönkirchen Tief, Prottes Tief oil fields and the Aderklaa and Baumgarten gasfield are relief pools, while the Schönkirchen Übertief, Reyersdorf and Aderklaa Tief gas fields are internal ones. All gas is sour gas. Schönkirchen Tief is the second largest oil reservoir in Austria and Schönkirchen Übertief is the second largest gas reservoir.

The Vienna Basin has played a leading role in the development of oil and gas production in Austria first from the Neogene floor, and later from the Calcareous Alpine dolomites of the second floor.

In the Austrian part of the Vienna Basin, at least 46 fields have been found. The largest cumulative oil production (till the end of 1991) was achieved in Matzen (Neogene, 65.6 Mio t), Schönkirchen Tief and Prottes (Hauptdolomit, 8.8 Mio t) and Mühlberg (Neogene, 5.5 Mio t). The largest cumulative production of gas has been in Matzen (Neogene, 24.9 Bill m^3n), Schönkirchen Übertief (Hauptdolomit, 6.6 Bill. m^3n) and Zwerndorf (Neogene, 12.2 Bill m^3n).

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