Paleozoic Oil in the Novosibirsk Area


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A commercial flow of oil was recovered from Paleozoic carbonate rocks in May of 1974 in the Malo-Ich area, which is located to the north of Novosibirsk in West Siberia. This oil field occurs on a local structure of the third order in the southeast part of the Nyurol depression. The anticline extends 35 km in a northwest direct and is 4–8 km wide; amplitude is more than 50 m.

Well 1, which was drilled on the south cupola of the fold (see Fig. 1), was completed without testing because of catastrophic absorption of drilling mud in Paleozoic carbonates. Well 2 was drilled using slighter mud and was successful.

Geophysical logging and petrographic studies indicate that strata $M_1$ and $M_2$ are oil-bearing. See Fig. 1. Strata $M_3$ and $M_4$ are possibly oil-bearing.

Stratum $M_1$ consists of dolomitic limestones and limey dolomites, which are fractured and cavernous. Stratum $M_2$ is composed of fractured-cavernous limey dolomites that have a high clay content; basalt layers are also present. Stratum $M_3$ is dolomitic limestone, and stratum $M_4$ is limestone with layers of effusives.

Strata $M_1$ and $M_2$ have an open porosity of 1 to 6% and a fracture permeability of 0 to 6000 md. Testing of these two strata has yielded commercial flows of oil. Testing of strata $M_3$ and $M_4$ yielded formation water with films of oil.

The oil from stratum $M_1$ has a density of 0.85 g/cm$^3$; beginning of boiling at 69°C; content (in percent) of: sulfur 0.4, asphalt 2.3, tar 5.7, paraffin 4.35; viscosity of 17.1 stokes; fraction boiling to 200°C, 21%; and to 300°C, 41%. In comparison with the Mesozoic oils of the West Siberian platform, the Malo-Ich oil has a lower discharge of low-boiling fractions and a considerably greater content of tars, asphalts, and paraffin.

Many facts indicate that the Paleozoic sediments of West Siberia are an independent oil-generating complex and constitute a separate exploration target. The primary objectives are the areas adjacent to the Malo-Ich field.