Exploration for Oil and Gas Pools in Traps of Non-Anticlinal and Combination Types on the North Border of the Peri-Caspian Depression

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The north border of the Peri-Caspian depression was the site of reef-forming processes from Late Devonian to Early Permian time, inclusively. A Lower Permian barrier reef is present here and probably also two other barrier reefs - Devonian Tournaisian and Oksko-Bashkirian in age.

The Lower Permian reef has been traced in several drilling profiles and outlined clearly by many seismic profiles. New deep drilling data have now been gathered from a profile of deep wells along the line Shchuchkinsko-Zapadno-Teplov. See Fig. 1. This drilling shows the reef proper, the trans-reef lagoonal-shelf facies, and the depression facies.

The Lower Permian barrier reef is a regional zone of oil-gas accumulation. The pools occur on raised sectors of the reef in combination traps that are bounded in part by transverse faults.

The largest field here is the Zapadno-Teplov. The pool is 190 m high and 1.5-2.0 km wide. The yield from well 14 reached 84 m³/day of oil, 144 m³/day of condensate, and 349 thousand m³/day of gas. The oil has a density of 0.8578, sulfur content of 0.41%, and a viscosity of 0.979 cst.

Eleven potentially oil-gas-bearing uplifts are now known in the belt of Lower Permian barrier reefs. See Fig. 2. Depth to possible pay zones does not exceed 2700-3000 m.

The barrier reefs of earlier Paleozoic age - the Devonian Tournaisian and the Oksko-Bashkirian - are displaced to the south with respect to the reefs of the Lower Permian here in the Ural’sk region. The depression-side flanks of these stratigraphically lower reefs may have been the site of deposition of clastics of Bobrikovsko-Malinov and Verey age, and these clastics may be host to oil and gas pools in lithologic and combination traps. The reefs themselves may also be traps. Fourteen potential reef traps have been recognized.