Oil-Gas Prospects of the Permo-Triassic Sediments in the Zone of Junction of North Ust-Urt and the Peri-Caspian Depression

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(Neftegazovaya Geologiya i Geofizika, no. 6, p. 14–17, 1978)

Permo-Triassic sediments are widely distributed throughout North Ust-Urt. They are largely organic rocks, and their thickness is up to 3 km.

Recent seismic surveys and drilling along the eastern shore of the Caspian Sea have disclosed a zone where Permo-Triassic rocks of different structural affinities are in direct contact with one another. The South Emba fold zone is not continuous but rather becomes closed off completely at about the meridian of Tabynay. See Fig. 1. On its continuation is a zone of relatively high occurrence of undeformed sediments filling the Severo-Kultuk Paleozoic downwarp and including Permo-Triassic deposits.

A good idea of the structure of the Permo-Triassic sediments is gained in the area of the Prorvin swell, where they are penetrated by 13 wells. Their thickness at the crests of salt structures is 387-490 m, and on the flanks it reaches 700-900 m and more.

Five productive horizons have been disclosed within the Permo-Triassic on the Prorvin swell; these consist of fine- and medium-grained sandstones, siltstones, and conglomerates. Individual horizons do not persist over the area; they pass into more dense, clayey rocks. The reservoirs are the fracture-pore type, and their filtration and capacity are not bad. In wells 68 and 11a, yields of oil reached 50-120 m$^3$ per day. The density of the oil is 0.88-0.89, viscosity 26 cst, sulfur 1.18%, and paraffin 3.8%.

The Permo-Triassic sediments dip regionally to the south. At a distance of 20-25 km from the Prorvin swell there is a well defined structural step where thickness of the Permo-Triassic more than doubles to 2000-2500 m. See Fig. 2. These sediments rest directly on the Carboniferous here; the salt has pinched out.

The combination of covering Permo-Triassic rocks and underlying Carboniferous and Devonian with a common history of downwarping created conditions favorable for intensive generation of hydrocarbons. The Carboniferous and Devonian are more than 5 km thick and have a high potential for generation of hydrocarbons. The regional dip would have been favorable for lateral migration of these hydrocarbons into the Permo-Triassic sediments. See Fig. 2.

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