Oil-Gas Potential of the Triassic Sediments of the Eastern Cis-Caucasus

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With each passing year exploration is targeted on deeper and deeper sediments in the North Caucasus. In the Eastern Cis-Caucasus such sediments are the Triassic system. Within the Vostochno-Manych downwarp commercial oil and gas have now been found in five areas. See Fig. 1.

The oil pool of the Zimnyaya Stavka field has been penetrated by three wells located at the crest of an uplift on Cretaceous and Jurassic beds. It occurs in fractured carbonate rocks of the Lower Triassic Neftekum formation. The oil-bearing interval in well 8 is 96 meters thick. See Fig. 2.

Five kilometers to the east of Zimnyaya Stavka well 8 is Vostochnoye well 20 where testing of Lower Triassic Neftekum carbonate rocks yielded an intense flow of oil. The pay zone at the crest of the structure appears to be about 100 m thick.

The first indication of oil in Triassic sediments in the Urozhaynen area was found in 1965 during testing of volcanic-sedimentary rocks of the Upper Triassic-Lower Jurassic (Nogay series). A flow of light oil was recovered. In 1968 a flow of oil with gas at 127 m$^3$ per day was obtained from Lower Triassic limestones.

Commercial oil was discovered in Triassic sediments of the Sovkhoz field during testing of dark gray dolomites and very argillaceous limestones. The discovery well yielded 73 m$^3$ per day of oil.

In 1973 during testing of Yuzhno-Buynak parametric well 1, which was drilled in the axial area of the Vostochno-Manych downwarp, a commercial flow of gas condensate was recovered from Triassic sediments. Beneath the Lower Jurassic the well penetrated a 520-meter unit of Triassic. The lower part of this unit in the 4460-4520 m depth interval (Neftekum fm) consists of clayey limestones of the Lower Triassic. The upper part in the 4000-4460 m depth interval consists of variegated tuff-sediments of the Nogay series of the Upper Triassic-Lower Jurassic. The pay zone is in the 4451-4455 m interval.

Data obtained during drilling of individual wells (Velichayev well 13, Zimnyaya Stavka well 8, Ozek-Suat well 69, and others) indicate that the clayey-carbonate rocks of the Lower Triassic are highly fractured. Sectors of greater fracturing are generally related to crests of subsided folds in the Permo-Triassic complex or with zones of faulting. During drilling of wells 8, 91, and 92 in the Zimnyaya Stavka area it was established that the crest of the large buried fold is to the south of these wells. See Fig. 2. Wells 8 and 92 turned out to be productive. Data from wells 13, 44, and 45 of the Velichayev area show a steep (greater than 35°) dip of the base of the limestones of the Neftekum formation toward the southeast. See Fig. 3. Well 13 is located the highest structurally; it encountered strongly fractured carbonate rocks of the Lower Triassic.

It is concluded that the clayey-carbonate complex of the Triassic is an independent oil-generating unit. The similarity of the oils and bitumens of the Triassic and Neocomian sediments as well as hydrodynamic data indicate that Triassic oil has flowed upward into the Jurassic and Neocomian sediments.