Present Status and Goals of Oil and Gas Exploration in Yakutia

Yu. P. Tikhomirov

The Yakutia Geological Administration has carried out geological and geophysical prospecting for oil and gas in the Verkhoyansk downwarp, the Vilnyyn synclise, and on the south down-dip flank of the Anabar anticlise.

In the enormous area of the republic, which exceeds 3 million sq km, the volume of oil exploration in 1960 has been small.

For the two years of the Seven Year Plan, 35,500 m of deep wells have been drilled. The plan for the growth of gas reserves has been fulfilled by 110%. One more new gas field has been discovered.

The main volume of exploration work in 1960 has been directed toward study of oil-gas productivity of the Mesozoic complex of sediments of the two largest structural elements in the northeast part of the Siberian platform—the Verkhoyansk downwarp and the Vilnyyn syenclise. See Fig. 1.

The Verkhoyansk downwarp, which separates the Siberian platform and the Verkhoyansk fold system, is complex geologically. The thickness of only the Mesozoic complex of sediments reaches 7000-8000 m in it.

On the geosynclinal border of the downwarp, geological-geophysical work has revealed the Tukulan, Kitchano-Buralakh, Yundulyug, and Sobopol zones of forward folds, which extend into the downwarp. The uplifted parts of the downwarp are separated by the Tompon and Lunkhinsko-Kelin, Linden, Dzhariykan, and other depressions.

In the zones of the forward folds, rocks from the Lower Cretaceous to the Permian inclusively are exposed at the surface.

Sediments of the Cenozoic, which are present at the surface in the depressions, rest unconformably on the older rocks and therefore hamper clarification of their geology.

In recent years anticlines have been determined in the depressions by gravity and seismic surveys and by core drilling.

The Verkhoyansk downwarp joins in its central part with the Vilnyyn synclise, which is a large region with a thickness of Mesozoic sediments of 5000-6000 m.

The Vilnyyn synclise is of ancient origin. It is possible that it was already in existence during the Cambrian. The presence in the western part of the synclise, in the Kempendyay depression, of sediments of Devonian to Cretaceous age indicates the protracted (to the Late Cretaceous) down warping of the synclise.

Structures of two orders are recognized within the synclise. Genetically the synclise is closely related to the Verkhoyansk downwarp. During Mesozoic time this relationship was expressed in an overall basin and a common sharing of many structures of the second order. Large structures of the central part of the downwarp, e. g., the Kitchano-Buralakh zone of forward folds and the Linden and Lunkhinsko-Kelin depressions, continue into the Vilnyyn synclise.

The Linden depression extends from the mountain structures of the Verkhoyan through the Verkhoyan downwarp into the Vilnyyn synclise, where a large portion is located.

The Kitchano-Buralakh zone of forward folds on the geosynclinal flank of the downwarp terminates at the Ust'-Vilnyyn anticline. On the platform flank, direct continuations of this zone of folds are the Nizhne-Vilnyyn, Badaran, and Nedzhelin anticlines, which occur on the southeast flank of the Khapchagay buried uplift.

The Lunkhinsko-Kelin depression, which is bounded by the Kitchano-Buralakh zone of forward folds on the south, just as the Linden depression, is included within the Vilnyyn synclise.

A similar regularity is observed on the south part of the downwarp, as, e. g., in the Tukulan zone of forward folds.

Attention is called to the transverse direction of the structures of the second order with respect to the Verkhoyansk downwarp: this is possibly related to their development on older structures having trends that are different from the Verkhoyansk.

On the platform flank of the downwarp opposite the zones of forward folds are located large ancient uplifts: opposite the Kitchano-Buralakh zone—the Khapchagay, opposite the Tukulan—the southeast part of the Yakutsk. These uplifts served as buttresses during the