Experience in Quantitative Evaluation of Prediction of Oil-Gas Productivity

A. A. Aksenov, Yu. M. L’vovskiy

(Neftegazovaya Geologiya i Geofizika, no. 8, p. 17–20, 1980)

Differential evaluation of oil-gas prospects taking into account tectonic regionalization was used in the Volgograd Region. Specific regions and sectors were recognized where oil and gas reserves were maximum; these were regarded as the main exploration plays. For example, in the Touraisian-upper Frasnian oil-gas complex there is a reef belt 10-18 km wide and more than 60 km long along the west border of the Umetovsko-Linev depression where the specific density of reserves is ten fold greater than in adjacent areas.

In the oil-gas complex of the clastic Devonian on the west of the Kamensko-Zolotov zone of highs is the Aleshinkov arch which is 50 km long and 5-7 km wide. The specific density of hydrocarbon reserves is high here also. An analogous but less specific zone is in these same sediments on the west of the Antipovsko-Shcherbakov zone of highs.

In the Peri-Caspian depression within the Volgogradsko-Yeruslan mega-arch is the Aleksandrovsko-Dobodin swell, which is 100 km long and 6-8 km wide. Maximum specific density of hydrocarbons is found in carbonates of the Touraisian-Lower Bashkirian section.

A necessary condition for using the differential approach to quantitative evaluation of prediction of oil-gas productivity is to increase the significance of the qualitative evaluation. A group of specialists compiled a map of qualitative evaluation for each oil-gas-bearing complex using the following parameters: average weighted effective thickness of the productive units, their average weighted porosity, average area of pools, and average height of oil column. The ratio of productive area to total area was also used.

A limited relationship was found between the qualitative and quantitative evaluations of oil-gas prospects using average weighted porosity, average weighted effective thickness, and the ratio of productive area to total area. The quantitative estimate bears a probability character.

The resulting map of quantitative evaluation of oil-gas productivity of the Volgograd region was compiled by superposing calculated and standard segments of all complexes and adding all the corresponding specific densities of reserves. See Fig. 1.