



Geological and Geochemical Aspects of Abiotic Origin of Oil and Designing of a Special Well Drilling for Monitoring of Endogenous Processes

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The study area is the South Tatarstan Arch located in the Volgo-Ural Region, which is an enigmatic crustal segment occupying one third of the East European Platform. It has been calculated that the cumulative production in some oil-rich areas of the Romashkin oil field substantially exceeds formerly proven recoverable reserves. Moreover, the volume of oil produced has already significantly exceeded the amount of oil that the clay-cilicon-carbonate Domanik strata could have generated as the supposed source rocks of the territory of Tatarstan oil fields. Cumulative oil production in Tatarstan has already reached 3.2B t, thus substantially exceeding 709M t, calculated geochemically on the basis of the Paleozoic source rock potentials of all sedimentary strata (Muslimov and Plotnikova, 1998). This discrepancy shows that it is improbable that such commercial amounts of hydrocarbons have been generated from the available material of the sedimentary cover. Because of this problem, the hypothesis must be evaluated that the source of oil is not the sedimentary rocks. This forced us to search for another potential cause of the formation of gigantic oil fields (e.g. Romashkino) in this area. The hypothesis of vertical migration of oil and oil saturated fluid from a source located below the surface of crystalline basement has been considered in this study.

The insufficient maturity of organic matter in Domanik clay-cilicon-carbonate formations obviously shows the impossibility for generation of industrial quantities of oil, which have filled traps in Paleozoic sedimentary cover. The insufficient maturity of organic matter in Devonian clay layers also is not enough for the commercial amounts of hydrocarbons and oil fields generation.

Integrated analysis of deep drilling, geological data, geochemical characteristics of oil composition and trace elements of oil, geochemistry of dispersed organic matter of Devonian and Carboniferous deposits except the remote migration of oil from the sedimentary strata of the Urals Foredeep and Prikaspian depression toward the South Tatarstan Arch. Dominated role of the deep factors in generation of oil is grounded by results of deep drilling and geological, geochemical, geophysical investigations.

Thus it is logical to suppose that, if such a replenishment of oil fields with fresh doses of hydrocarbons in the form of gas and light hydrocarbons does take place in our times, then they must be delivered through the existing refill channels,

such as fracture zones. Modeling of such an oil field recharge mechanism can establish new criteria for searching for prospective portions of a pool, which in turn can prompt new approaches to exploration and development of oil fields.

The analysis of the data about oil recovery on Romashkin oil field has been made. In the same territory studying of a deep structure of earth crust according to seismic prospecting has been executed. The received results have allowed to prove a site of drilling of a special well for research of endogenous processes.