

## **Petroleum Potential of Pre-Jurassic sediments in Anabaro-Khatanga Area**

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### **ABSTRACT**

The area of interest is located on the north part of the Krasnoyarsk region in the valley of the Khatanga river. It extends from the east to the west on the Big Begichev island to the Labaz lake and from north to south on the Taimyr mountains to the Central Siberian Plateau. Area is 124 000 km<sup>2</sup>.

There is the largest number of oil shows on the territory in the Upper Paleozoic and the Lower Mesozoic sediments. As a rule, oil shows in the Triassic sediments are confined to the disjunctive zones and have a smaller distribution area compared to them in the Permian sediments. Oil shows of varying intensity are fixed directly to the ground surface (peninsula Nordvik, Chaydah river channel, south-eastern shore of the bay Kozhevnikovo, etc.), and in the wells of deep drilling areas: Ilyinskaya, Kozhevnikovskaya, Chaydahskaya, Uzhno-Tigyanskaya. The maximum oil flow of 12,3 m<sup>3</sup>/d was obtained from nizhnekozhevnikovskaya formation of Permian age in the well Uzhno-Tigyanskaya P-102. Thus, the aim of the work is the oil and gas potential estimation of the pre-Jurassic sediments overlying crystalline basement Archean-Proterozoic age. The petroleum systems modeling approach was used for this estimation.

The geological structure of studied area have influenced by following tectonic events: Vendian rifting, Salair accretion, Hercynian folding, early kimmerian accretion, Permian-Triassic magmatism, Triassic rifting, Neocomian transpression, Oligocene-Miocene uplift. These stages of tectonic evolution were taken into account in the basin model simulation or as uplift stages with subsequent erosion of deposits, or as activation mantle processes that influenced the increase of heat flow.

By lithology pre-Jurassic rocks can be divided into two major intervals: Riphean-Lower Carboniferous and Middle Carboniferous-Triassic. Riphean - Lower carbon interval is characterized by clastic-carbonate composition and includes a salt-deposits supposedly Lower-Middle-Devonian age. Middle Carboniferous-Triassic sediments have a terrigenous composition and include volcanic-sedimentary rocks of the Upper Permian-Lower Triassic age. Throughout the geologic section there are dolerite composition intrusive bodies of late-Permian-Triassic age.

Well tops, regional geologic maps, seismic data 2D and seismic well logging data was analyzed to build a structural framework. Database for allocation source rocks and analyze their chemical characteristics and maturity were collected (Rock-Eval, geochemical studies of oils and bitumens, vitrinite reflectance). Upper Riphean, Lower Cambrian, Upper Devonian and Lower Permian ages clay intervals were defined as source rocks.

The modeling revealed that the Middle Cambrian and Late Devonian source have made main contribution to the liquid hydrocarbons accumulations and Riphean, Middle Cambrian and Late Devonian – to the gaseous hydrocarbons accumulations. The sharp increase in the rate of hydrocarbon generation falls on the the Permian-Triassic period, associated with the massive trappean magmatism.

The most perspective interval is subsalt clastic-carbonate rocks presumably Silurian-Devonian age. Most perspective zones for oil and gas were identified. Recommendations for licensing the territory were given.