

ИССЛЕДОВАНИЕ И СРАВНИТЕЛЬНАЯ ХАРАКТЕРИСТИКА ПРИКАСПИЙСКОЙ НЕФТЕГАЗОНОСНОЙ ПРОВИНЦИИ И ОТЛОЖЕНИЙ ТЮМЕНСКОЙ СВИТЫ В ЗАПАДНОЙ СИБИРИ

EXPLORATION AND COMPARATIVE CHARACTERISTICS OF CASPIAN OIL AND GAS PROVINCE AND SEDIMENTS OF TYUMEN SERIES IN WESTERN SIBERIA

Швецова Анастасия Владимировна

магистрант,
Астраханский государственный
технический университет
d_hansen@bk.ru

Седики Дарья Берузовна

магистрант,
Астраханский государственный
технический университет

Аннотация. В настоящее время значительную роль в экономическом секторе РФ играют доходы от экспорта нефтегазовых ресурсов. От курса стоимости барреля нефти или объемов поставок природного газа зависит формирование государственного бюджета. На территории РФ природные ресурсы распределены неравномерно, что создает дополнительные сложности при транспортировке сырья и продуктов переработки потребителя. Таким образом, цель данного исследования – составление сравнительной характеристики Прикаспийской нефтегазоносной провинции и отложений тюменской свиты в Западной Сибири.

Ключевые слова: нефтегазовый комплекс, Прикаспийская нефтегазоносная провинция, Тюменская свита, оценка запасов природных ресурсов.

Shvetsova Anastasia Vladimirovna

Undergraduate,
Astrakhan state technical university
d_hansen@bk.ru

Sediqi Darya Beruzovna

Undergraduate,
Astrakhan state technical university

Annotation. Currently, a significant role in the economic sector of the Russian Federation play revenues from oil and gas exports. Formation of the state budget depends on oil and gas prices. Location of natural resources on the territory of the Russian Federation is uneven, that makes additional difficulties in the transportation of raw materials and products of processing to consumer. In this way the aim of this work became an exploration and comparative characteristics the Caspian oil and gas province and sediments of Tyumen series in Western Siberia.

Keywords: fuel and energy complex, the Caspian oil and gas province, Tyumen suite, estimated reserves of natural resources.

Nowadays oil and gas industry is playing a main role on the world's arena. The economics of the most developed countries depends on the course of oil barrel price and on the delivery volume of natural gas.

But in oil and gas industry of the Russian Federation the serious problem is arriving – working deposits are depleting with time and new technologies aren't applying not far everywhere. That's why a great importance has not only a searching of new fields but the exploration of already learnt processes to optimize production and recycling to extract a maximum profit. In this way the aim of this work became an exploration and comparative characteristics the Caspian oil and gas province and sediments of Tyumen series in Western Siberia [1].

The area of a large and long-term immersion in the present structure of the Earth's crust, which are associated with many areas of oil and gas and supply their oil gathering area is called oil-and-gas-bearing fields. That's not the same thing, when we talk about oil-and-gas-bearing fields and oil and gas province.

Tyumen series (Aalensky – Batsky Layers) have been allocated in layer of Tyumen keyhole. Series are introduced as a difficult alternation of light grey strata assorted sandstones, having darker colour aleuro-lites, the most clayey sandstones, grey clays, dark-grey, green-grey and black carbonaceous strata of brown coal thickness up to 10 m.

Pre-Caspian depression in the regional tectonic plan is southeastern deep-seated part of ancient Eastern European platform. It's unique for the ancient Precambrian crystalline basement in its middle seated to depth 22–24 km (geophysical facts). From the basement to sides (eastern, northern, western and southern) the surface of the foundation stepwise rises to depths up to 6–7 km. Depths of occurrence of oil and gas field horizons hesitate from 200 m to 800–1000m, rarely to 2000–3000 m.

Precipitation and sediments formed during their diagenesis accumulate in the relief depressions (at the bottom of the oceans and seas, lakes, river lengths intermountain depressions, etc.) and, as a rule, initially have a horizontal mode of occurrence. They form geological flattened body called layers. A Layer is a flattened geological body with relatively homogeneous geological composition and structure that bounded approximately by parallel division surfaces. The bedded structure of the sedimentary thickness determined by alternation of layers.

For example, in the article «Some patterns of accumulation of oil and gas at platforms» written by N.U. Uspenskaja was dating this definition: «A large geographical distribution of oil and gas accumulations associated by unity of the geological history and structure, which is characterized by uniform facies and types of structures that control of oil accumulation and bitumen formation is called oil and gas province» [2].

Accordingly, N.U. Uspenskaja considers that in some cases oil and gas province are cavity of different age and in other cases it is large arched uplifts or group of uplifts on the side of large structures etc.

Petroleum potential of Tyumen series is set in many areas of Western Siberia and in the studied areas – it's everywhere. The main volume of stocks UV is concentrated in their higher strata (U2, U3) that justify the presence of powerful regional cover (clayey sediments of the Abalak's series or Nizhnevasyugansk's subseries). However, the experience showed that industrial congestions UV are concentrated in many squares of the stratum U4. We know about the petroleum potential in strata of middle and lower subseries, but debits of oil from them in learned areas not more than 5 m³ per day.

When analysing patterns of distribution of known and potential zones accumulation of oil and gas allocated in the oil-and-gas-bearing fields the ratio of these areas is considered in connection with the current structure of the Earth's crust, taking into account the geological changes experienced by the data portion of the earth's crust. A lot of oil-and-gas-bearing fields which were formed in earlier geological periods, continue to exist now, preserving the basic features of their structure. Some areas of subsidence viewed as oil-and-gas-bearing fields are completely changed not only its shape, but also on structural forms strata of rocks formed in them in the period of sedimentation [3].

Thus far, oil-and-gas-bearing fields which were created in the Paleozoic, are preserved now only on platforms with Precambrian basement as well as the foothills and intermountain basins areas dipping Paleozoic folded structures.

Sedimentary cover of the Pre-Caspian petroleum potential province (6–24 km) subdivides into three litho-stratigraphic mega-complexes: subsalt, post-salt (Meso-Cenozoic and Higher Permian) and separating them saliferous (Lower Permian, Kungur Layer). On many area rocks are revealed and learnt by drilling of Meso-Cenozoic salt-bearing complex and subsalt: Asselsky, Sakmarsky and Artinsky Layers of Lower Permian and coal sediments. Devon rocks are revealed by the holes in limits of separated fields (Karashtaganak, Tengis and others). Caspian platform petroleum potential province of Paleozoic-Mesozoic, partially Cenozoic oil and gas accumulation has an extremely wide stratigraphic range of petroleum potential. In studied sedimentary cover there are Devon, Coal, Lower Permian, Triassic, Middle- and Higher Jurassic, Lower Chalky and Neogene (Pliocene) regional productive complexes. Coal and Lower Permian subsalt complexes have the main accumulations of hydrocarbons in them.

Regional migration of hydrocarbons, their differentiation, accumulation and redistribution can occur during all existence of oil-and-gas-bearing fields. At the varied stages of their development some kind of above processes can be predominant: strengthened or weakened depending on the geological conditions of formation of oil-and-gas-bearing fields. Associated with these processes, the formation of petroleum and gas fields can not occur evenly in oil-and-gas-bearing fields. Some depression and the raised portions are distinguished in the structure of oil-and-gas-bearing fields [4].

Accumulation of sediments of Tyumen series was going in unstable conditions, changed in time and space of sub aerial and shallow marine situations of sedimentation that predetermine high lateral and vertical variability of collector's properties of its strata. Main number UV in Tyumen series is concentrated in its higher strata (U2, U3) and also in stratum U4. Petroleum potential strata of lower and middle subseries (U5–U9) are limited and presence of high-capacity collectors isn't marked in them. In contradistinction to this, main perspectives of petroleum potential in Pre-Caspian province certainly have subsalt sediments (Lower Permian, Coal, Devon, may be more ancient). Perspectives of petroleum potential of post-salt sedimentary complex are also rather high.

As a result of conducted explorations we can make a conclusion that further exploration and development of learned fields are expedient and economical.

Литература: / References:

1. Classification of types of geological layer and their prediction in interwell space using factor analysis on example of fields of Western Siberia and Tatarstan / A.Y. Saprykina, D.S. Kucheryavenko, S.S. Gavrilov // *Geology, Geophysics and development of oil and gas fields.* – 2008. – p. 42–52.
2. Regularities of spread of collectors in sediments of Tyumen series on west of Shirotnoe Pribye / V.S. Slavkin, T.E. Ermolova // *Geology of oil and gas.* – 2010. – 3. – P. 52–60.
3. Sorohtin O.G., Ushakov S.A. «Razvitie Zemli». – M. : Izd-vo MGU, 2002. – P. 306.
4. Ezhova A.V., Ten T.G. *Prakticheskaya litologiya : Uchebnoe posobie.* – Tomsk : Izd. TPU, 1999. – 103 p.