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SOME METHOD OF PROBABILITY ASSESSMENT OF GEOLOGICAL RISKS WHILE PROSPECTING FOR OIL FIELDS ON TERRITORIES WITH HIGH DENSITY OF COMMERCIAL DISCOVERIES

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Oil fields prospecting is connected with high risks of its negative result, e.g. with absence of fields containing commercial reserves of hydrocarbons. Despite technological updating of the working process, oil producing regions show regular decrease of efficiency of prospecting for new oil fields. This fact is explained by big fields depletion and (or) searching operations transfer into less prospective regions. Tendency of complication of new fields searching conditions is traced practically for all "old" oil producing regions. Thus, planning of investment projects in oil and gas industry is rather specific, firstly, due to information high ambiguity.

While prospecting for oil the main part of its cost falls on exploratory wells drilling, the purpose of which is to find a commercial oil field. On the other hand, a great amount of statistical data is accumulated for areas with high density of commercial discoveries, allowing efficient implementation of probabilistic-statistical methods. Quantitative assessment of geological projects risks while oil prospecting can serve the basis for it. Practical feasibility of such a probabilistic assessment is justified by totality of three main factors, namely, high probability of negative results of searching operations in case of standard techniques application (70 %), high cost of exploratory wells drilling (tens millions of rubles) and principle possibility of application of probabilistic-statistical methods in areas with high density of drilling. It is obvious that proper recognition of deposits and negative results of searching prior the stage of deep wells drilling at a level close to 75 % gives a big economic effect.

The article, taking into consideration available international experience, analyzes methods of accounting of geological risks which can appear while prospecting for oil. Prediction of prospective effectiveness of one of the long-developed areas serves...
an example for substantiation of some probabilistic method of geological risks accounting when planning new projects of oil production. The method consists in justification of forecast estimates of prospecting successfullness, distribution of discoveries of oil commercial deposits and estimation of potential hydrocarbon reserves. The probabilistic method allows performing forecast estimates of projects economic estimation on the basis of geological risks assessment. Possibilities of the developed probabilistic method are illustrated by the example of comparison of probabilistic forecasts and actual results obtained during definite projects searching of oil deposits.

Key words: probabilistic-statistical methods; mathematical expectation; correlation factor; prospecting for oil deposits; success factor; geological risks; oil reserves.

UDC 553.98(571.1)

PROSPECTS OF IPATOVSKY HORIZON IN THE EAST OF KHANTY-MANSI AUTONOMOUS TERRITORY (p. 14)
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The article presents express-analysis of geological-geophysical data witnessing the availability of deposits in the eastern part of Khanty-Mansi autonomous territory. The express-analysis resulted in identifying of a number of indicators for prospecting for oil deposits and actual results obtained during definite projects searching of oil deposits.

Key words: Ipatovsky suite; reflecting horizon; formation; deposit; collector.

UDC 553.98(571.1)–17

PROBABILITIES OF IDENTIFICATION AND DEVELOPMENT OF HYDROCARBON BIG FIELDS ON THE SHELF OF THE CENTRAL PART OF VOSTOCHNO-BARENTS MEGA-TROUGH (p. 23)
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Identity of fields discovered in Shtokmanovsky-Ludovskovy saddle point and perspective local structures-traps in Demidovsky-Fersmanovsky-Medvezhensky, as well correlation of their seismic sections served the basis for giving recommendations on placement and depths of exploration wells in the above-mentioned second object.

Key words: Vostochno-Barentsvenkovsky mega-trough; productive horizon; structures-traps; oil and gas accumulation; productivity of deposits.

UDC 553.98.041

OIL- AND GAS-BEARING POTENTIAL OF THE SIBERIAN PLATFORM FOUNDATION (VERKHNECHONSKY FIELD IS TAKEN AS AN EXAMPLE) (p. 27)
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Nepsko-Botuobinsky region’s structure of Siberian platform is analyzed, foundation of one of the main fields of the province, namely, Verkhnechonsky, is studied in detail. Description of rocks, forming the base of hydrocarbons accumulation, their geophysical and petro-physical characteristics is given; processes of secondary porosity formation (fracturing, cavern porosity, cataclasis) are considered. Analysis of core, GIS data and wells testing resulted in developing of 3D geological model. Perspective territories of all possible collectors’ development, connected with regional unconformity zones, dynamo-metamorphism and metasomatism, are identified. Deposits volume in the foundation over-covered by sandy-gravel basalt sediments of VCh1, (Bh1) and VCh2 (Bh2) formations (the main objects of development) is evaluated. Recommendations on development of the object under study are presented.

Key words: secondary porosity (fracturing, cavern porosity, cataclasis); geophysical characteristic; GIS data.

UDC 553.98.061.4

COLLECTORS LITHOLOGICAL TYPIFICATION AND RISKS ASSESSMENT AT THE INITIAL STAGE OF PROSPECTING FOR A FIELD (p. 33)
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The article considers possibility of lithological typification of a field’s collectors with the aim of further prediction of their spreading as well as probabilistic assessment of hydrocarbons potential resources at the early stage of a field’s studying (exploration). The objective of the research was lithological-facies typification of a field’s rock-collectors as well as probabilistic assessment of hydrocarbons potential resources at the early stage of a field’s studying (exploration). Experience of predicting of spreading of the identified types of collectors, being available at present, allows address prospecting and exploratory drilling of complicatedly-built hydrocarbon deposits.

Key words: lithological typification of a field’s collectors; assessment of hydrocarbons potential resources; address prospecting.

UDC 553.98.04

UNDISCOVERED HYDROCARBON RESERVES OF THE SOUTH-EASTERN PART OF MOSCOW SYNECLISE (p. 40)
Shilovskaya T.I., Shilovsky A.P.
Geology of the south-eastern part of Moscow synecise is up-to-date the least studied one, consequently, bearing in mind conclusions, made on the basis of geological exploration results of the 60s of the last century, oil and gas potential of the territory is estimated as very low. Our investigation results based on all existing data reinterpretation, including prospecting data, received during the previous years, allows giving alternate, rather high, estimation of oil and gas potential this area.

**Key words**: hydrocarbon reserves; Moscow synecise; oil and gas potential.

**UDC 553.263.465**

**OIL AND GAS POTENTIAL OF THE NORWEGIAN SECTOR OF THE BARENTS SEA (p. 46)**

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Continental margins of the Barents Sea represent some mosaic of pools formed in the course of Pangea supercontinent decay during the Late Mesozoic and Cenozoic era and followed by seafloor spreading to the west of Spitsbergen. The Barents Sea shelves are entirely located to the north of the Arctic Polar Circle in the territorial waters of Russia and Norway, the largest part of the shelf lies at water depths less than 500 m. Exploration activities are primarily concentrated in Hammerfest trough, located in the Norwegian sector of the Barents Sea, however lately prospecting operations were intensified on Finnmark platform, Nordkapp trough and in some other areas. The thickness of the sedimentary cover of the area is very variable – from 7…10 km in Hammerfest trough up to 20 km in the north-east sector of Nordcape trough.

The sedimentary section consists of Paleozoic, Mesozoic and Cenozoic formations. Nine parent rocks from Tertiary to Devonian inclusive are identified in the section. The sedimentary section has 10 productive strata generated during the period of time since the moment of their generation and up to the present day. A detailed study of glacial erosion, sedimentation accumulation, sedimentary cover thickness, geothermal regime in various structural elements of the basin determine specific conditions for hydrocarbons generation and accumulation as well as for these hydrocarbons conservation in the course of time since the moment of their generation and up to the present day. A detailed study of glacial erosion, sedimentation accumulation and ice material is the most important and insufficiently used factor while assessing the prospects for the remaining hydrocarbon resources in the Barents Sea in the whole and in the Norwegian sector in particular.

**Key words**: seafloor spreading; prospecting-exploration activities; sedimentary section.

**UDC 553.982**

**METALLIFEROUS OILS AND POSSIBILITIES OF VANADIUM RECOVERY OUT OF THEM (p. 55)**

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The paper summarizes researches on transformation of naphthides (oil and bitumen) composition in various oil and gas basins of Kazakhstan and Russia (Volga-Urals, Timan-Pechora and PreCaspian – Buzachinsky arch) during supergene processes with the aim of identifying of their specific features to assess commercial quality of oils as hydrocarbon raw material, enriched by commercially significant toxic metals. Researchers’ attention is drawn to the importance of the problem, the necessity of integrated approach to commercial vanadium-bearing naphthides is emphasized, some modern methods of valuable metals extraction out of them are presented.

**Key words**: supergene processes; vanadium-bearing oils; trace elements; oil- and gas-bearing basin; naphthides; natural bitumen.