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Analysis of geological criteria for oil and gas bearing of structural zones and local objects

Volchenkova Alla¹, Vovk Marina^{2*}

¹ National University «Yuri Kondratyuk Poltava Polytechnic» <https://orcid.org/0000-0002-0516-7550>

² National University «Yuri Kondratyuk Poltava Polytechnic» <https://orcid.org/0000-0003-1408-9010>

* Corresponding author E-mail: nning.vovk@nupp.edu.ua

The main criteria of oil and gas bearing capacity within oil-producing areas and promising regions are highlighted, depending on the peculiarities of their geological. Regional and local traps were analyzed and deposits were discovered in oil-gas areas. Installed the most favorable conditions for the formation of large and medium oil and gas deposits. It was established that the main criteria of oil and gas capacity are determined by the structural, tectonic, lithological and facies conditions of the territorial development. The regularities of the detection of traps and deposits are related to the nature of the tectonics of the region. The most favorable conditions for the formation of reservoir rocks and deposits of oil and gas within large structures belong to paleo uplifts. An important conclusion was made about the most promising areas within oil and gas industrial areas.

Keywords: criterion of oil and gas capacity, lithology, facies conditions, structural and tectonic conditions, reservoir rock, graben, formation

Аналіз геологічних критеріїв нафтогазоносності структурних зон і локальних об'єктів

Волченкова А.В.¹, Вовк М.О.^{2*}

¹ Національний університет «Полтавська політехніка імені Юрія Кондратюка»

² Національний університет «Полтавська політехніка імені Юрія Кондратюка»

*Адреса для листування E-mail: nning.vovk@nupp.edu.ua

В статті виділено основні критерії виявлення родовищ нафти і газу та їх залежність від особливостей геологічної будови території. Проаналізовано перспективні, прогностичні та виявлені зони нафтогазонакопичення в межах нафтопромислових районів. Виявлено найбільш сприятливі умови для формування крупних і середніх родовищ нафти і газу. Встановлено, що основні критерії нафтогазоносності пов'язані з петрофізичними характеристиками осадових гірських порід, що обумовлені тектонікою та структурними особливостями території. Основними літологічними умовами, що сприяють формуванню покладів нафти та газу є присутність надійних покришок і порід-колекторів, їх широке територіальне розповсюдження та здатність вмщувати та зберігати поклади вуглеводнів. Важливою умовою формування значних покладів є відсутність сильної піщаності та глинистості продуктивного розрізу. Виявлено, що найбільші продуктивні поклади кам'яновугільної системи родовищ центральної частини Дніпровсько-Донецької западини мають найбільші за товщиною покришки. Всі крупні поклади газу та нафти антиклінальних структур пов'язані з пачками колекторів, перекритих потужними витриманими покришками. Закономірності у виявленні пасток та покладів тісно пов'язані з характером тектоніки регіону. Найбільш сприятливі умови для формування порід-колекторів та покладів нафти та газу в межах крупних структур належить палеопідняттям. Описано методику визначення сприятливих умов для оцінки перспектив нафтогазоносності. Також встановлено найбільш сприятливі структури для формування порід-колекторів та покладів нафти і газу. Виділено окремі геологічні райони та товщі порід, які мають погіршені умови для формування пасток для нафти і газу. Зроблено важливий для практики висновок про те, які саме геологічні зони мають найвищу перспективність стратиграфічних комплексів, присутність надійних покришок і порід-колекторів. Основні перспективи Дніпровсько-Донецької западини пов'язані з північним та південним бортами та перехідними зонами.

Keywords: критерій нафтогазоносності, літологія, фаціальні умови, структурно-тектонічні умови, порода-колектор, грабен, формація



Introduction

A significant number of theoretical statements concerning the origin of hydrocarbons and the formation of their deposits cannot serve as a reliable basis for predicting the richest zones of oil and gas accumulation. Therefore, when choosing the main criteria, it is necessary to focus mainly on the relationships actually observed in nature and the existing regularities in the location of the discovered oil and gas fields, depending on the geological structure of the territory.

Thus, the oil and gas-bearing provinces of Poland contain hydrocarbon deposits within the boundaries of the Polish Lowland and the Carpathian foothills [1], where deposits have been explored at various depths (3-5 km), in structural and lithological traps and mostly sandy reservoirs. New study using 3D modeling confirms deep and ultrahigh gas accumulations beneath the regional carbonate platform and gas traps on the flanks of salt domes [2].

Regularities in the location of oil and gas accumulation zones and oil and gas deposits within them in oil and gas-bearing provinces are determined mainly by the structural-tectonic and litho-logic-facies conditions of the territory's development. They can be considered the main criteria for the oil and gas capacity of areas of the earth's crust.

Review of the research sources and publications

The main directions of research in the search for hydrocarbons have always been large traps and promising structures with powerful reservoir rocks, but due to the decrease of open deposits, there was a need to allocate criteria for oil and gas capacity among off-balance and conditional-balance objects, as well as search for oil and gas among deep, inaccessible horizons in difficult geological conditions [3].

When choosing promising objects, they focus on the actually productive (open) stratigraphic section of oil and gas bearing capacity. The peculiarities of the distribution of oil and gas deposits in the earth's crust have been studied by scientists Yarboboev T. Akhmedov Sh., Usmonov K. and others [4].

However, the connections and existing regularities in the location of discovered oil and gas deposits are much broader. The main direction of research should be the study of the geological structure of territories and individual local structures. The study of the spatial variability of local layers is engaged in Krivulia S., Lyzanets A., Troyanov O. and others. The authors focus on palaeo-channel objects as the main anticlinal traps [5].

Currently, there are a number of criteria for forecasting the oil and gas potential of certain areas of the oil and gas-bearing provinces [4, 6-10], but these criteria don't take into account the results of applying new research methods, new data, including geophysical and the results of deposit modeling [11], results of drilling deep wells with core selection and analysis [12].

Thus, there is a problem of identifying promising oil and gas-bearing zones taking into account lithological, facies, tectonic, structural signs of the presence of oil and gas in formations of various scales of oil and gas-bearing provinces and deposits.

Definition of unsolved aspects of the problem

Analysis of various oil and gas provinces of Ukraine and the world allowed making a conclusion that the patterns of field location are closely related to the nature of the regional tectonics plan of the region and lithology.

Consequently, there is a need to identify clear the criteria of oil and gas content based on the analysis of already discovered oil and gas deposits and forecast data.

Problem statement

Identification of patterns of placement of local or global objects of oil and gas-bearing and development of classification of oil and gas content criteria is an urgent task that requires careful study.

Justification of favorable conditions of formation reservoirs and deposits, their association with global and local structures and dedicated this article.

Basic material and results

Analysis of different provinces of Ukraine and the world allowed to generalize, that the patterns of deposits location are closely related to the nature of the regional tectonics plan of the region and lithology.

That is, the presence or absence of industrial accumulations of oil and gas in certain zones (areas and large structures) is determined primarily by their general geostructural position relative to the areas of oil and gas formation.

Practice shows, that none of the confined basins of the world with sedimentary cover thickness up to 2000m no significant oil reserves found.

The second important factor almost complete absence of deposits in the sedimentary cover outside the

Devonian and Carboniferous sediments of oil and gas deposits, carbonate, carbonate-terigenous and terigenous formations of which are considered as oil and gas generating complexes Dnieper-Donetsk basin (Lukin O., Shestopa V.) [13].

Based on these data, the main areas of oil and gas formation should include submerged areas with the presence of a terigenous complex of rocks in favorable geochemical facies. These include the deep horizons of the Dnieper-Donetsk basin [3] and Western Oil and Gas Region of Ukraine [14].

Data on reconstruction of tectonic deformation fields and tectonophysical analysis of geostructures the Dnieper-Donetsk basin made it possible to allocate territories Western part of the Donetsk of the Donetsk Plicate Area, and corrected tectonic zoning scheme Dnieper-Donetsk basin makes it possible to highlight the priority of hydrocarbon traps [15].

Thus, it is natural that those areas and large structures that are within the areas of oil and gas formation or are in close proximity to them are the most promising for the search for oil and gas fields. Conversely, remote areas (structures) or areas located close to the oil and gas formation area or areas located close to the oil and gas formation area but not connected (lack of convection reservoirs, structural conditions, etc.) should be considered as less favorable formations for reservoir.

This is an important condition for the formation of industrial deposits, which concerns not only the Dnieper-Donetsk basin.

Critical importance in the placement of deposits belongs to lithological (reservoirs rock, impermeable rock), tectonic and hydrogeological conditions, and these conditions, above all, must be considered specifically when evaluating individual zones or stratigraphic complexes in promising and oil and gas areas.

Lithological criteria.

As you know, the volume of reservoirs rock and their actual capacity is determined by the features of the section of oil and gas complexes. Many well-known scientists and geologists paid attention to this important issue of oil and gas geology, in particular: Gavrish V. [9], Lazaruk Y. [10] and others., - who considered the lithological factor dominant in creating conditions for oil and gas accumulation.

A favorable condition for a high assessment of oil and gas prospects is the variability in the lithological composition of sedimentary rocks. If the sediments are only clayey or sandy, the probability of opening commercial accumulations of oil and gas here is much less than in sedimentary rocks, represented by alternating sand, clay and limestone rock strata.

The degree of prospects of the sand strata depends to a greater extent on the number of local anticlines, and to a lesser extent on strata that are replaced by poorly permeable rocks

Sedimentary strata composed entirely of limestones and dolomites are more favorable for the exploration of oil and gas deposits than those composed of sandstones and clay formations, since carbonate strata may contain both reservoir rocks and poorly permeable layers that ensure the reliability of traps. Similar conclusions have been drawn Shehata A., Sarhan M., conducted seismic interpretation of Cretaceous and Carboniferous deposits of the Beni Suef Basin (Egypt) [16].

According to research Gavrish V. [9], cyclicity of paleostructural development is closely related to cyclicity of sedimentation, breaks in sedimentation, oil and gas content, productivity of complexes.

The features of the forecast and genesis of permeable strata in their works were paid attention to Lazaruk Y., Sekerina S. [10], who emphasize, predicting the zones of development of reservoirs rocks it is necessary to use a complex of paleomorphological and facies constructions with a detailed correlation of the geological section and interval analysis.

Also, on the example of studying the oil and gas content of the Greater Caucasus (Gurbanov V., Narimanov N., Sultanov L., Abbasova G., Ibragimli M.), namely, the study of petrophysical parameters and properties of reservoir rocks Cretaceous, Paleogene-Miocene age in tectonically difficult conditions showed high prospects and good reservoir rock properties [7].

Consequently, the combination of sufficiently thick strata of highly porous reservoir rocks with a impermeable rock creates favorable conditions for the formation of significant oil and gas deposits, the small thickness of the reservoir dramatically reduces the volume of the trap. Reduction of the thickness of impermeable rock

limits the height of the deposits, causing their incomplete filling and, as a result, a decrease in their quantity compared to the possible.

Thus, the lithological factor has an extremely important role both at the stage of formation and reforming and preservation of large oil and gas reserves.

The authors' own research to determine the dependence of the oil and gas content of the section on the size of its sandstone content has been established, that the critical value of the development of sand formations, above which conditions for the formation of deposits are unlikely, is 20-25% in geological sections that are disturbed by disjunctive dislocations, which are actually ways of vertical migration of hydrocarbons along the section.

That is, predominance of sand component of the geological section in the presence of intensive formation of normal faults do not create conditions for the preservation of deposits. Such a geological section is definitely the way of hydrocarbon migration, as evidenced by numerous examples of residual oil saturation of sand formations.

Attention is drawn to the fact that all large deposits of gas and oil of anticlinal structures are associated with the thickness of reservoir rocks overlain by powerful sustained impermeable rock. Studies on a number of deposits in the central part of the depression established a direct connection between the height of the Lower Carboniferous deposits and the thickness of impermeable rock. This dependence was proved at twelve fields associated with anticlinal structures, in particular: Kachanovsky, Anastasievsky, Kharkivtsevsky, Rybalsky, Artyukhovsky, Klinsko-Krasnoznamen'sky, Gadyatsky, Opishnyansky, Glinsko-Rozbyshevsky. A characteristic feature of this type of deposits is the formation of massive-stratum deposits under reservoirs rock.

Such dependence is not observed in fields associated with intermittent-consolidation anticlinal structures. They are characterized by completely different patterns, namely:

- development in the cross-section of productive strata of often interbedded reservoir rocks and impermeable rocks, as a consequence of the cyclic-rhythmic nature of sedimentation;
- overlapping of reservoirs from the top and bottom with compacted clay rocks;
- wide gas saturation stratigraphic interval;
- the presence of several deposits (up to 15-20) with their own gas and water contacts and small reserves;
- normal or close to hydrostatic formation pressures.

Despite the small reserves (up to 2-3 million tons) of structural forms of this type, they have significant industrial significance. Only fields in close proximity to production areas are of commercial importance [15].

Large hydrocarbon reserves can form in zones where reservoirs wedge on regional slopes and slopes of positive structures of all orders. A pre-requisite for the formation of deposits in lithological and stratigraphic traps is the presence of a reservoir wedged upward along the approach, and impermeable overlapping and underlying layers.

This type of deposits has been established in a number of fields and is assumed within the south-eastern part of it in the following zones: Northern outskirts of Donbass (Starobilsk-Millerovsky mon-ocline and Krasnoritsky strip); elongated gentle pericline and slopes of the Mashevsko-Alekseevskaya, Gadyatsko-Zagoryanskaya, Shurinsko-Medvezhanskaya and flexure zone of the combination of the southern coastal part of the depression with the central graben; slopes of all shaft-shaped forms (Kotelevsky-Berezovsky, Zachepilovsky-Leventsovsky, Sor-lokhovsky-Dikansky, etc.) and within the elongated gentle wings and periclinal of the Maloso-rochinsko-Radchenkovsky, Visachkovsky-Romodanovsky, Glinsko-Robyshevsky ramparts, Kachanovsky cryptodiapir, Lubensky-Belotserkovsky deep ledge. The prospects of deposits within the boundaries of buried diapirs (salt structures) have been proven within the boundaries of world oil and gas fields. Salt structures are both lithological and tectonic factors of oil and gas content [6, 17].

The main prospects of oil and gas content of the Dnieper-Donetsk basin should be associated with the northern and southern side and transition zone between the Dnieper graben and Donbass folded structure [18].

Areas of geological zones are unfavorable in terms of lithological features for creating conditions for formation of traps and hydrocarbon deposits in deposits of major oil and gas complexes:

- Khukhryansko-Tyrlovskaya (C2, C1s, C1v, Pt);
- Northern outskirts of Donbass (C1v2, C1v1-t, Pt);
- Komyshnyansko-Kolomatskaya (on the site Kamyshnyansko-Kharkivtsevskaia – C1v2, XIIa MFG, on Bulgarian-Kolomatskaya – C1v2, C1v1-t, P1-C3);
- Shurinsko-Medvezhanskaya (C1s1, C1v2, C1v1-t);
- Abazov-Lozovskaya (in the area from the eastern pericline of the Oktyabr structure to Lozovskaya in the east – (C1s, C1v2, C1v1-t);
- Baranikovsky-Plachidovskaya (in the area of Valuyско-Markovsky areas S1s1 and S1s2 as a result of glinization and lagoon-chemogenic type of section, which are unfavorable for oil and gas accumulation);

- Bilanivsko-Kokhivska (S2, C1s). Commercial gas content of this part of the southern side is proved in Kremenovskaya and Novosyolovskaya areas;

- The Mashevsko-Alekseevskaya zone of the Mashevsko-Beretsko-Slavyanskaya zone is unfavorable for reservoir formation due to the absence of zonal and local seals local uplifts and the presence of reservoir rocks with limiting values of filtration and capacitance properties. According to lithological criteria, of all stratigraphic complexes, the most extensive planar prospects are: Middle Carboniferous in all zones, with the exception of the Tyrlovsky-Khukhryanskaya and Belanovsky-Kokhovskaya; Serpukhov in all zones, with the exception of the Yampolsko-Parkhomovskaya. The Upper Visean sequence has somewhat limited prospects due to the significant depth of occurrence

(> 7 km) and the uncertainty of the lithological composition - in the Mashevsko-Alekseevskaya, due to the density of the section - within the Belanovsko-Kokhovskaya and Abazovsko-Lozovskaya zones. The Lower Visean-Tournaisian and Lower Permian-Carboniferous complexes have local prospects within the Mashevsko-Alekseevskaya, Kamyshnyansko-Kolomatskaya (northern coastal part in the area from Val-yukhovskaya Square in the west to Maryinsky in the east) and Zachepilovsky-Leventsevskaya zones (Tab. 1).

Therefore, the main lithological conditions contributing to the formation of significant hydrocarbon deposits and oil and gas accumulation zones should include:

- presence of reliable impermeable rock and reservoir rocks in the prospective part of the section;
- wide territorial distribution of reservoir rocks and impermeable rock;
- the ability of the section of productive complexes in terms of the ratio of permeable and impermeable rocks to contain deposits;
- clay types of section, are not favorable for the formation of commercial hydrocarbon deposits.

Table 1 - Geological zones of prospects of stratigraphic complexes

The name of the stratigraphic complex	Geological zones										Rating of the stratigraphic complex
	I	II	III	IV	V	VI	VII	VIII	IX	X	
Upper Carboniferous-Lower Permian	○	▲	-	-	○	-	-	○	◆	-	5
The Mid-Carboniferous	◆	◆	○	▲	◆	◆	○	◆	◆	◆	4
Serpukhovian	▲	◆	○	◆	▲	▲	○	◆	▲	○	1
Upper Visean – Visean	▲	Depth > 7 km	◆	◆	▲	▲	○	○		○	2
Tournaisian-Lower Visean	▲	Depth > 7 km	-	◆	▲	○	○	○	Depth > 7 km	○	3
Rating of the zones	1	6	8	4	2	3	10	7	5	9	

Symbols: Degree of perspective – the highest ▲; high ◆; low ○

Tectonic criteria.

The tectonic factor plays a dual role in the formation and placement of oil and gas deposits. On the one hand, this is an indirect, indirect influence that large and large structures have (as well as the movements that form them), on the other hand, direct control of deposits performed by local structures.

Oil and gas accumulations in various types of structures occur simultaneously with the process of fluid migration along deep faults in the inversion period of development, when the general structural and tectonic appearance of oil and gas regions was formed. Analyzing large, average positive structures, it was concluded that they control hydrocarbon deposits and act as regional accumulators of hydrocarbons.

This circumstance, presumably, determines the natural confinement of the main oil and gas fields mostly to large structural forms and structural-tectonic elements of the Dnieper-Donetsk basin. This pattern is most clearly observed within the southeastern part of it. According to the geostructural position, the vast majority of the fields of the Dnieper-Donetsk basin, with which the main hydrocarbon reserves are associated, are confined to the following tectonic elements: - large ramparts of the central graben and coastal zones of the Dnieper-Donetsk depression: Glinsko-Rozbyshovsky, Solokhovskiy-Dikansky, Kotelevskiy-Berezovskiy, Chutovskiy-Rasashnovskiy, Krestishchenskiy-Efremovskiy, Mashevskiy-Sosnovskiy-Mirolyubovskiy, Malosorochinskiy-Radchenkovskiy and Zachepilovskiy-Leventsevskiy; - zones of deep lining of foundation protrusions (Lubensko-Belotserkovskiy, Lipovo-Dolinskiy, Novotroitskiy, Akhtyrskiy); - ring zones will rise on the slopes of the Sinovskiy, Kachanovskiy, Karaykozovskiy, Valkovskiy, Novosanzharskiy depression troughs; - structural and tectonic zones of the development of the subspecies of the Kharkov and Volchanskiy basement blocks of the northern flank of the Dnieper-Donetsk depression - Platovo-Belozirsko-South-Grakovskiy, Rakitnyansko-Ostroverkhovskaya-Aksyutovskaya, Narizhnyansko-Ogultsevskaya, Yulievskiy-Korobochkinskiy Gashinovskaya volost, Skvortsovskiy-Bezlyudovskiy-Vasishchevskiy-North-Korobochkiskaya district; - zones of the Krasnoritskiy step, bands of combination of the Starobelsko-Millerovskaya monocline with the Folded Donbass. Areas that are associated with the protrusions of the foundation may have the prospect of unconventional traps, because in such areas the zones of the foundation compaction that arose due to tectonic activation and can be accumulators (traps) of hydrocarbons are fixed [3].

The oil and gas-bearing of the tectonic elements of the southeastern part of the depression is due to the association with the zone of distribution of the main oil and gas formations. These thickness of rocks are closed structures that existed throughout the formation of the region.

Probably, all the changes in the tectonic plan of the territory of the depression research concerned mainly local structures. Inside the closed contour of the tectonic rampart, the loss of hydrocarbons accumulated in

previous eras was minimal: the hydrocarbons of the destroyed traps migrated to new traps.

This thesis was confirmed at a number of large shaft deposits when comparing data from bitumen-luminescent analysis of drilled rock in the productive and water-saturated part of the section (Glinsko-Rozbyshovskoye, Ignatovskoye, etc.).

In addition, the analysis of the effectiveness of exploration in recent years indicates a higher success rate on structures that are integral parts of large structural and tectonic elements. These structures should have an established industrial productivity of the section: Zachepilovskiy-Leventsevskiy shaft in the southern coastal part of the depression, Mashevskiy-Sosnovskiy-Mirolyubovskiy shaft in the central graben, on the northern slope - Ostroverkhovskaya and Yulievskiy-Korobochkinskaya structural zones, as well as the development zone of Krasnoritskiy-type structures. As a result, there are nineteen fields discovered by a subsidiary of Ukrgasvydobuvannya (UGV). The efficiency of oil and gas exploration is 60%.

It should be noted the absence of productive horizons in the open section of the West Spivakovskaya and South Shevchenko periclinal sections, tectonically limited blocks - Proletarskiy and South Korobochkinskiy, shielded by salt rods - Golubikhinskiy and South Mironovskiy - caused by the failure of local structures of different genesis to create trap conditions for hydrocarbons.

But most of the open sections where oil and gas deposits were not found are in remote areas.

Local structures directly control oil and gas fields, and sometimes the dynamics of their development affects the formation of local reservoir zones, confined mainly to their arch, wing and pericline parts.

The role of local structures in performing these functions is different.

The most favorable conditions for the formation of large and medium-sized deposits are inherited structures (Shebelinskoye, Zapadno-Sosnovskoye, Efremovskoye, Raspashnovskoye, Lannovskoye, Glinsko-Rozbyshovskoye, Yablunovskoye, Medvedovskoye, Melikhovskoye, Kotelevskoye, Berezovskoye etc.).

In the groups that are allocated and by the intensity of formation, the number of large and medium-sized deposits is inversely proportional, and the number of small ones is directly proportional to the intensity. This is due to the repeated migration of hydrocarbons through the fault system (Srednyakovskoye, Kibintsevskoye, Kulichikhinskoye, Yuryevskoye, Stepnoye, Maryinskoye, Karaykozovskoye, Khukhryansko-Chernechchinskoye, Golikovskoye).

For poorly intense and intermittent-post-sedimentary structural forms, oil and gas deposit with one deposit are characteristic.

It should be noted that for intensive and poorly intensive structures, the impermeable rock plays the main role in the formation of significant deposits. At critical values of its power, the intensity of the formation of structures contributes to the destruction of deposits

(Kadnitskaya, Kruglyakovskaya, Kovsharovskaya, Zapadno-Kovsharovskaya, Yuzhno-Druzhelyubovskaya, Severo-Shchiglovskaya and others). In particular, this negative effect is observed when structures are complicated by faults with amplitudes that exceed the thickness of the impermeable rock.

Under the the impermeable rock of a thick seal, the significant intensity of the structures not only does not violate the storage conditions of hydrocarbons, but also contributes to their replenishment from new sources and the formation of a massive-stratum deposit, as is the case in the Lower Carboniferous deposits on the Glinsko-Rozbyshevsky, Kachanovsky, Yablunovsky, Ignatovsky and Lower Permian-Upper Carboniferous deposits - on the Shebelinskoye and deposits of the central part of the depression with practically the only absolute mark of the lower limit of commercial gas content rock.

It should be noted that these conditions are peculiar only to those oil and gas fields, the amplitude of rupture faults on which does not exceed the thickness of the impermeable rock.

Large deposits are often found in low-intensity structures, because here there are not accidental and determining here are the conditions for the preservation of deposits. Probably, with sufficiently powerful impermeable rock, the degree of intensity does not play a decisive role, the conditions of preservation are determined by it, but with critical capacities of the impermeable rock, the tectonic factor - the degree of intensity of the structure becomes crucial, since a significant intensity violates the solidity of the impermeable rock and contributes to the destruction of the deposit. The best preservation conditions are provided by low-intensity local structures and a lithofacies-layered type section, discontinuous-sedimentary structural forms, which are actually local complications of long Paleozoic structural zones. Their oil and gas content rock is usually controlled by stratification of the section with subordinate development of reservoir rock and a thickness not exceeding their amplitude or lithological limitations in the critical direction. Their industrial significance lies in the combination of inherited and newly formed structures, combined into a single extended tectonic element with a common structural contour.

Thus, both local and larger structural forms (and, accordingly, the movements that cause them) comprehensively affect oil and gas content. They can be both a factor necessary for the formation of the field and a factor determining the amount of reserves. The most favorable for the formation of hydrocarbon deposits are local structural forms confined to large extended structural-tectonic elements of the depression: shafts, ledges, zones, etc.

Less favorable structures for the formation of deposits with large reserves include individual local uplifts confined to structural-tectonic stages that complicate monoclinic slopes.

And, accordingly, the worst conditions for oil and gas content are large monoclinals, especially under the condition of continuity of reservoir rocks and the presence

of a system stepped normal fault with a subvertical angle of discharge (60-80°).

This is probably the reason for the negative results of the search for oil and gas on the Gukovskaya, Korotitskaya, Maloroganskaya, Mostovaya and other areas of the northern side of the Dnieper-Donetsk basin.

If the structure is limited by a gentle normal fault, as well as a wide development of unconformable normal fault on structural-tectonic stages, there is a potential possibility of accumulating significant hydrocarbon reserves in a wide stratigraphic range.

A rather striking example is the Yulievsko-Koro-bochkinsko-Gashinovskaya zone of the northern side and a chain of structures along with the system of gentle Krasnoritsky normal fault.

Conclusions

Thus, as a result of analysis of the literature sources and new geological and geophysical materials regarding the role of the tectonic factor of the petroleum-and-gas-bearing of the main productive complexes of the southeastern part of the Dnieper-Donetsk basin it was established:

- of decisive importance are the large raised structural forms of the second order, which retained the prerequisites for the accumulation of migrating hydrocarbons during all cycles of geotectonic development of oil and gas territories, and have generating sources to reliably store them;

- within the extended structural-tectonic elements of the second order, the main role in the redistribution of hydrocarbons and the formation of deposits belongs to local uplifting developed within their boundaries;

- accumulation of deposits in large structures and local uplifting developed on the intensity of their formation, thickness and type of reservoirs rock;

- large raised tectonic elements (shafts, ledges and steps) of the southeastern part of the depression actually represent a single multi-wedge structural form with different hypsometric level of their position and formation time.

Consequently, in the southeastern part of the Dnieper-Donetsk depression, the oil and gas accumulation is controlled by large second-order uplifts, which are complicated by local ancient lower-order uplifts. The most favorable for the formation of reservoir rocks and oil and gas deposits within the boundaries of large structures belongs to ancient uplifts, and optimal conditions for the formation of large and medium-sized deposits existed within the boundaries of consedimentation ancient uplifts and accordingly, degraded conditions exist on local structures confined to large monoclines.

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