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GEOLOGICAL AND GEOPHYSICAL STUDY OF THE ASSAKEAUDEN TROUGH

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ABSTRACT
The article describes the oil and gas prospecting work carried out within the territory in question, systematic solution of problems of different nature and geological research, the results of which served as material for the state geological map and an explanatory note to it. The following anticlines distinguished Shakhpakhta anticline, Central Ustyurt and Muzbel anticlinal zones, Aibugir and Shorji anticlines, Assakeudan and Barsakelmes troughs.

Keywords: territory, anticline, basement, geological survey, zone, aeromagnetic survey, gravimetric survey, electrical survey, seismic survey.

INTRODUCTION
Oil and gas prospecting within the considered territory began to be carry out since the beginning of the 1950s. At the first stages, they solved regional problems, at the same time the tasks of search character were set. In 1944-1946, within the limits of Central and Southern Ustyurt, in the lower reaches of Amu-Darya and Zaunguz Karakums, N.P. Luppov and A.A. Yashin conducted geological survey, and its results served as material for compilation of the state geological map on scale 1:1000000 and an explanatory note to it. Shakhpakhta anticline, Central Ustyurt and Muzbel anticlinal zones, Aibugir and Shorji anticlines, Assakeudan and Barsakelmes troughs were distinguished for the first time. The issue of oil and gas bearing capacity of Mangyshlak and Ustyurt scientifically substantiated.

In the 1960s-1970s, aeromagnetic and gravimetric surveys, electrical prospecting and MOD seismic surveys carried out. The results of magnetic and gravity surveys were the first objective data reflecting the general features of the underlying tectonics and determining the direction of further hydrocarbon prospecting on the Ustyurt plateau.

The territory of the Ustyurt region completely covered by small- and medium-scale gravity surveys with large-scale detailing of individual areas. The structure of the gravity field of the region considered in the works of N.Y. Kunin, T.L. Babadjanov, B.B. Tal-Virsky and others. The gravity field of the Ustyurt region caused by the total influence of density in homogeneities of the basement and borders of the sedimentary cover. The South Aral zone of predominantly positive anomalies, the North Ustyurt minimum, the Central Ustyurt zone of maximums and the South Ustyurt minimum are distinguished here (Fig.1).

The South Ustyurt (Assakeaudan) minimum is located south of the Central Ustyurt maximum and is part of the extensive South Mangyshlak-Ustyurt minimum caused by the depression of the same name. The nature and appearance of the field of local gravity anomalies here changes sharply. It becomes very quiet, with predominance of negative values, with a small number of local anomalies of insignificant intensity. In the field of local gravity anomalies, a number of smaller maxima with relative amplitude up to 2.0-3.0 mgl, corresponding to local structures are distinguished.

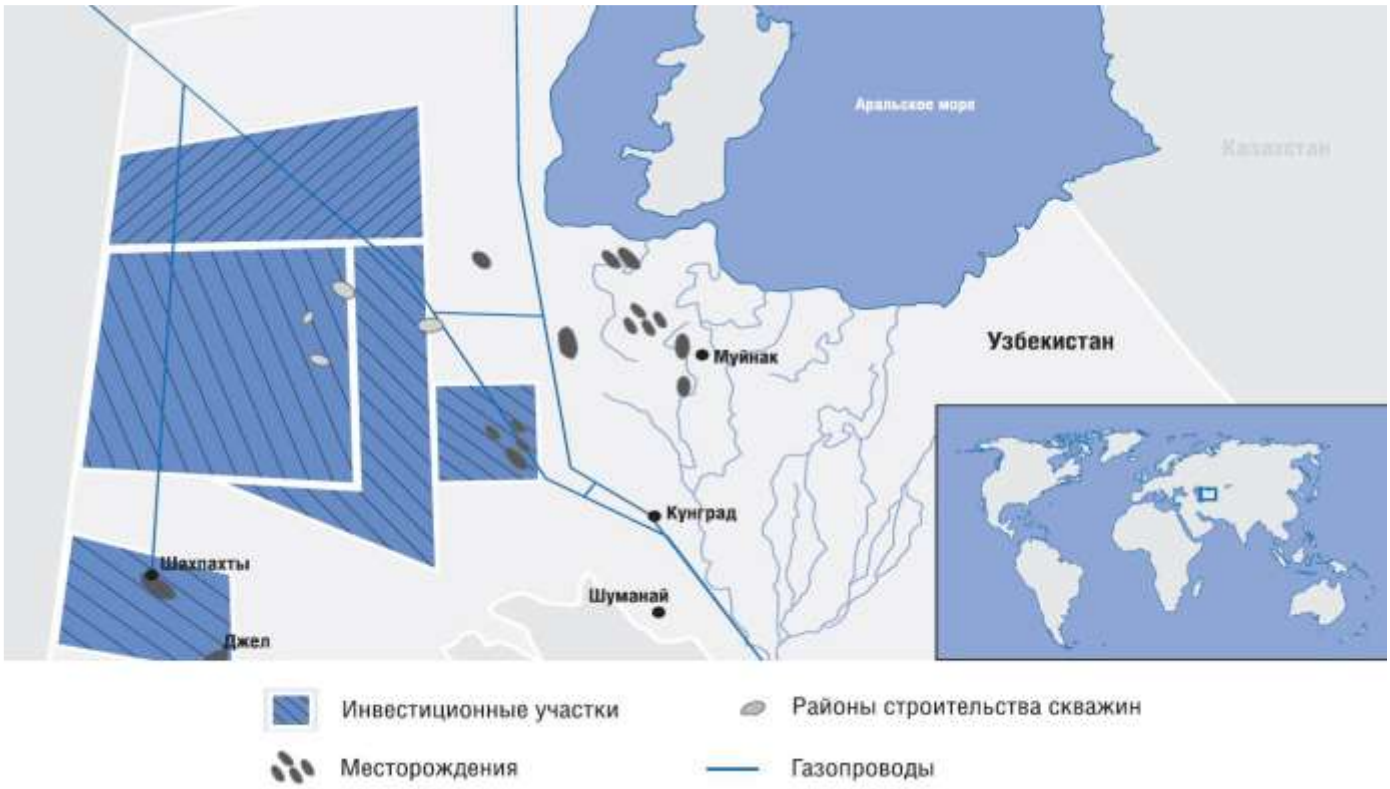

Fig.1. Scheme of the location of the oil and gas prospective territory of the Ustyurt plateau.

The territory of the Ustyurt region completely covered by small- and medium-scale magneto metric surveys. The magnetic field structure of the region considered in the works of L.N. Kotlyarevsky, I.G. Kremnev, I.A. Fuzailov, S.O. Borisov. According to these authors are distinguished South Aral region of mosaic field, South Ustyurt region of regional minimum, Central Ustyurt region of interference fields, North Ustyurt region of calm field.

The main sources of these anomalies are petrological heterogeneity of the basement and the topography of its surface. The magnetic field also reflects the discontinuous tectonics. Thus, to the east of the territory in question, a zone of positive magnetic field strength is distinguished, extending in the meridional direction. According to its location, it corresponds to the Aral-Kyzylkum deep fault. Based on the aeromagnetic surveys, taking into account the drilling and research data, a scheme of the material composition of the surface of Paleozoic deposits made.

Electrical surveying carried out in different modifications (DEZ, TT, MTZ, and MTP). The most informative were the MTZ materials, which confirmed some elevations in the reference horizons, established geoelectric heterogeneities in the sedimentary cover and intermediate complex, clarified the structure of the basement, and traced the deep tectonic disturbances.

In order to prepare structures for drilling, electrical prospecting methods proved ineffective, as they allowed only a qualitative assessment of the anomaly of the formative objects.

Since 1959, seismic surveys have been conduct on the Ustyurt plateau using various methods: MOD, CMPV, SSS, VSP, and CDP.

Seismic surveys of the LFSS carried out to solve problems of regional character. The territory covered by the regional profiles of the LFSS with a distance of 10-15 km between them. Because of these works, the depth structure of the basement studied in general terms, and the main structural-tectonic elements and large faults identified.

Prospecting works carried out mainly in the areas of large rises in order to map the Jurassic sediments and search for oil and gas traps in them.

A qualitatively new stage of studying the territory connected with the mid-1970s, when seismic surveys by the CDP methodology began to be widely introduced into the practice of exploration works. Within the limits of the territory in question, a number of anticlinal structures in Jurassic horizons identified and submitted for deep drilling, areas of wedging of Lower Jurassic, Permo-Triassic deposits fixed, and surface of Paleozoic deposits mapped.

Based on the results of borehole VSP seismic surveys in wells № 2P Shakhpakhty, № 3 Nikolaevskaya velocity characteristics of the section were determined, the wave field was studied, reflecting horizons were stratified, frequency characteristics of reflected waves were determined.

Based on the materials of the gas survey, anomalously high concentrations of HC gases (methane, ethane, etc.) in the near-surface layers above the Shakhpakhty structure were established and practical recommendations for further work in the Ustyurt region given.

Deep, parametric, reference, prospecting and exploratory drilling carried out within South Ustyurt (table). Development of the territory under consideration began with drilling of parametric wells at the Shakhpakhtinsk stage, aimed at studying the deep structure, prospects of oil and gas content of the section, searching for industrial accumulations, with subsequent exit of exploratory drilling. In order to isolate stratigraphic complexes and tie them to reflecting seismic horizons to improve the accuracy of depth, in conjunction with regional seismic surveys, reference drilling carried out [1-5].

A total of 43 reference, parametric and prospecting wells were drilled, including 15 at the Shakhpakhty field (2 parametric, 2 prospecting and 11 exploratory wells). Of the remaining 28 wells, eleven wells completed upon completion of in-column sampling, fulfilled their geological objectives. Four wells (North Assakeaudan 2, 3, Karaaudan 1 and Tamarly 1) completed without sampling, two wells (Karaaudan and Tamarly) had O&G and C&I due to increased gas readings during drilling. Methane gas samples obtained during the survey. However, the areas withdrawn from exploratory drilling due to unpromising prospects. Nine wells (South Tasoyuk 1, 2, Kossor 1, 2, V.Assakeaudan 2, Assakeaudan 1 op, Nikolayevskaya 1, 2, Uzunkui 1) completed because of the impossibility to continue the work, i.e. due to the accidents that occurred.

Deep drilling in this area was study in two stages: from 1962 to 1973 and from 2008 to 2012. It was during the first stage when there were many accidental wells.

Based on the results of MOGT-2D seismic surveys, prospective oil and gas targets were prepared for exploratory drilling: Ergazy and Ergazy Prirazlomnaya.

Table Results of the study of the oil and gas potential of the Assakeaudan trough

№№ п/п	Name of area	№ wells	Depth, m sediment age		Signs of oil and gas potential
			plan	actual	
1	2	3	4	5	6
1.	Assakeaudan	1оп	3800 PT	2750 J_3	Formation
2.	North Assakeaudan	1	3000 PT	2624 PT	water
3.		2	3100 PT	2588 PT	Water with dissolved gas
4.		3	2800 PT	2390 PT	Liquidated
5.	Eastern Assakeaudan	1	2500 PT	2393 J_1	Without running the production string and testing

6.		2	2500 PT	2084 J_2	Liquidated
7.		3	2500 PT	2466 PT	Without running casing and sampling
8.	Kubla Assakeaudan	1	3900 PZ	3902 C_2+C_1	Weak gas not measurable
9.	Kindyksay	1	3500 PZ	3501 PZ	Water with dissolved gas
10.	Nikolaevskaya	1	3700 PT	3292 J_2	Drilling water
11.		2	3700 PT	2597 J_2	drilling
12.		3	3700 PT	3704 J_2	Eliminated
13.	Tasayuk	1	2400 PT	2247 PT	Category III
14.	South Tasayuk	1	2400 PT	2210 J_2	Formation
15.		2	2400 PT	2480 PT	water
16.	Otynchi	1	3000 PZ	3001 PZ	Dissolved gas water
17.	Dzhel	1	3100 PZ	3049 PZ	Gas inflows
18.		2	2950 PZ	2950 PZ	Gas inflows
19.		3	2625 PT	2625 PT	
20.		4	2750 PT	2750 PT	Gas inflow
21.	Kumoi	1	3400 PZ	3401 PZ	
22.		2	4170 Pz	4170 Pz	Gas inflow
23.	Karaaudan	1	3800 PZ	3800 PZ	
24.	Kossor	1	2500 PT	2568 PT	Weak gas
25.		2	3700 PZ	2499 J_1	Liquidated
26.		3п	2500 PT	3560 PZ	Category II item "a" Liquidated
27.	Tamarly	1	3800 PZ	3891 PZ	Liquidated
28.	Uzunkui	1	3500 PT	3130 J_2	Under the first category

As of 01.10.2021, two hydrocarbon deposits identified in the southern part of the Ustyurt OGP:
Shakhpakhta stage - 2 fields (Shakhpakhty and Dzhel).
Productivity is associated with Jurassic deposits from lower to upper Jurassic in the depth interval of 1700-2400 m; gas deposits are associated with anticlinal traps.
Most of the fields of Ustyurt oil and gas bearing region are complexly built, multilayered, under saturated, lenticular, lithological limited, the presence in the section of many sand channels, confined to the beds of paleoslides, called arm-like, characterized by sinuous contours, not aligned thickness and reservoir properties over area and section, wedged and compacted at the edge of the reservoir. The degree of knowledge of the geological structure of deposits of such fields and reservoirs at the exploration and prospecting stages. As well as in the development process does not always meet the requirements, which is why the search, exploration. Pilot operation (hereinafter OPE) and commercial development of deposits are often carried out without sufficient consideration of the features of a complex geological structure, physical and lithological characteristics of productive formations, the position of oil and gas content contours and gas and water contacts of deposits [6-10]. At the end, it leads to undesirable complications of reservoir pressure

drop, selective watering of pay zone, skipping or leaving more or less considerable part of residual gas out of development because of water clamping of gas.

Prospects of oil and gas bearing capacity of the Assakeaudan trough are confirmed by discoveries of industrial accumulations in the Shakhpakhty and Dzhelem fields, the most studied by drilling.

REFERENCES

1) Акрамов, Б. Ш., Хайитов, О. Г., Нуритдинов, Ж. Ф. У., Гафуров, Ш. О. У., & Жанабоев, Д. Б. У. (2020). Влияние гидродинамического несовершенства на производительность скважин. *Глобус*, (5 (51)).
2) Акрамов, Б. Ш., Умедов, Ш. Х., Хайитов, О. Г., Нуриддинов, Ж. Ф. У., Хамроев, У., & Зияева, Н. (2019). Инновационная технология разработки нефтегазовых залежей. *Наука, техника и образование*, (1 (54)).
3) Акрамов, Б. Ш., Умедов, Ш. Х., Хайитов, О. Г., Нуритдинов, Ж. Ф. У., & Мирзакулова, М. Н. К. (2019). Использование промысловых данных для определения запасов нефти залежей, разрабатываемых при водонапорном режиме. *Проблемы современной науки и образования*, (10 (143)).
4) G'OFUROVICH, H. O., ABDURASHIDOVICH, U. A., O'G'LI, I. J. R., & RAVSHANOVICH, S. F. (2020). Prospects for the industrial use of coal in the world and its process of reproducing. *Prospects*, *6*(5).
5) G'ofurovich, K. O., & Abdurashidovich, U. A. (2021). Justification of rational parameters of transshipment points from automobile conveyor to railway transpo
6) Khayitov, O. G., Salizhanova, G. K., Mutalova, M. A., Aminzhanova, S. I., & Mishareva, M. Y. (2021). Oil and Gas Potential in the Territory of the South-Eastern Part of the Bukhara-Khiva Region. *REVISTA GEINTEC-GESTAO INOVACAO E TECNOLOGIAS*, *11*(4), 4699-4708.
7) G'ofurovich, K. O., Abdurashidovich, U. A., Ugli, M. U. F., & Ugli, A. A. X. (2020). Justification Of The Need For Selective Development Of The Phosphorite Reservoir By Horizontal Milling Combines. *The American Journal of Engineering and Technology*, *2*(11), 159-165.
8) Khayitov, O. G. O., Ziyodov, N. R., Fatkhiddinov, A. O. T. O., & Umirzoqov, A. A. (2021). THE INTENSITY OF THE EFFECT OF THE EXPLOSION OF BOREHOLE CHARGES OF EXPLOSIVES IN MULTI-STRENGTH ROCKS OF DEEP QUARRIES. *Scientific progress*, *2*(1), 625-630.
9) Bozorovich, N. Q., Nugmonbekovich, K. D., Ogli, J. S. M., & G'ofurovich, K. O. (2020). Petrophysical modeling of granular collectors. *ACADEMICIA: AN INTERNATIONAL MULTIDISCIPLINARY RESEARCH JOURNAL*, *10*(12), 911-917.
10) Нуритдинов, Ж. Ф. У., Хайитов, О. Г., Акрамов, Б. Ш., & Ёкубов, О. С. У. (2021). ОСОБЕННОСТИ ОБВОДЕНИЯ СКВАЖИН С ВЫСОКОВЯЗКОЙ НЕФТЬЮ. *Scientific progress*, *2*(1), 1672-1678.