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Қ. И. Сәтпаев атындағы Қазақ ұлттық техникалық зерттеу университеті

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ГЕОЛОГИЯ ЖӘНЕ ТЕХНИКАЛЫҚ ҒЫЛЫМДАР СЕРИЯСЫ

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СЕРИЯ ГЕОЛОГИИ И ТЕХНИЧЕСКИХ НАУК

♦

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PALEOSOIC DEPOSITS AS OPTION FOR RESERVES REPLACEMENT & EXPANSION OF RAW MATERIAL BASE FOR PETROLEUM INDUSTRYIN MANGYSHLAK

Abstract. Putting together deep well logs that revealed the Paleozoic rocks on Karabogaz and Peschanomysko-Rakushechny plateaus, Segyndyksky trough, North-Bozashinsky and Kumsebshensky plateaus, with the well logs drilled at Berkut and Otpansky formations on the Karatau mega anticline and the Otpanskaya anticline and taking into account the new seismic data from the Zhargurlinsky trough, the authors conclude that in the late Paleozoic - late Carbon and the early Permian on the vast territory of Mangyshlak and in the south Ustyurt there existed a single sea basis that accumulated gray-carbonate-terrigenous sediments containing a significant quantity of limited substance, i.e. there were favorable paleographic and paleogeodynamicconditions for the development of oil and gas producing massives.

In the late Permian and early Triassic along the Scythian-Turanian planetary lineament, the Mangyshlak system of rifts is being formed, where anavalanche sedimentation of red-colored terrigenous rocks occurred. By the end of the Triassic, the rift system undergoes inversion and the Paleozoic and Lower Triassic sediments form folds complicated by fractures that are mapped on the Karatau and Bekebashkuduksky plateaus.

Within the Zhetybai-Uzen structure the Paleozoic deposits are weakly dislocated (South Zhetybai) and violated by faults up to Tenge-Tasbulat line. On the Zhazgurlinsky and Segyndyksky troughs, Paleozoic deposits are not dislocated, it is evidenced by new seismic materials and data in deep wells drilled in the Segyndyksky trough.

The results of geochemical research suggest gray-colored carbonate-terrigenous deposits of the Upper Paleozoic to the category of oil and gas producing. The presence of carbon microphosphills in oils of the Jurassic and Triassic horizons and their absence in skeletons of coeval reservoirs gives grounds for assuming about the important role of vertical oil migration and possible presence of older deposits with a significant oil and gas generation potential in the section.

The authors note that subsoil users should study the Paleozoic part of the section at the Mangyshlak sedimentary basin and suggest todrill a search-parametric well on the Ozen-PZ_1 structure, prepared by 2D and 3D seismic.

Keywords: paleozoic breeds, marine pool, retinues,oil, gas, layers,rifty, mikrofossilis.

Introduction & problem statement. Mangyshlak occupies a special place in Kazakhstan's becoming a world-class oil power, the region is the first both in hydrocarbon reserves and in terms of volumetric production. In the mid-70's, Mangyshlak after reaching the annual oil production of 15-17 million tons made Kazakhstan an internationally recognized oil producing country.

At present, when a relatively stable level of annual production is achieved through the heroic efforts and labor of Mangyshlak oil industry workers and the region, naturally, faces a problem of reserves replacement at the developed fields and opening new sites and deposits. New discoveries in South-Mangyshlak are possible and related to its maritime domain, although there are land areas still unexplored due to poor seismic exploration.

Upper Paleozoic deposits are becoming a new object for oil and gas search. There are different points of view about their origion. Some consider them as unproductive in terms of search for new deposits (3), the others consider them as an intermediate transition complex from the basement to a platform cover, admitting the possibility of existing some minor accumulations of hydrocarbons in them (1). Unfortunately, before the 2000s, Paleozoic deposits failed to be studied properly due to the prevailing of the geosynclinal development concept of the whole region named the Turanian young platform.

Earlier this century, chief geologist of JSC Kazmunaigas Dr. Iskaziev K.O. decides to revise old geophysical and geological materials on the Paleozoic part of the section and assess their possible oil and gas potential. So in order to make an overall interpretation of geology-geophysical data on Paleozoic part of the section Uzen-Karamandybassky deposit, there was established a consortium consisting of three seismic, gravimetric and aeromagnetic companies headed by Professor G.Zh.Zholtaev. The research results proved that it was possible to map out the Paleozoic section by seismic methods. So the group identified three layers of poorly disposed sedimentary deposits, the second of which was recognized by the nature of the wave field as the analogue of the carbonate-terrigenous gray-color massive belonging to the Upper Paleozoic age of Berkut sunk on the Karatausky reef, Central-Mangyshlaksky dislocation system. There were made up a geodynamic model of the pre-Jurassic complex and recommendations on drilling a 6000 m well at the Uzenoilgas field. Also the group justified the need for a targeted study of the Paleozoic section of the entire Mangyshlak and proposed to create a State program "Paleozoic Mangyshlak".

The Program proposals were based on the following action points. Firstly, the current understanding of the Hercynian age of the basement, where supposedly Paleozoic deposits should be deployed everywhere, is not supported by new drilling and seismic data. Secondly, analyzing geological and geophysical data of the past and the new years not only in Mangyshlak but also in the south of the Turan platform, we came to the conclusion that the crust of the region was formed as the result of splitting and subsequent joining of individual rigid blocks of the ancient continent or its parts (2).

Splitting probably occurred under the influence of the Ural-Tien-Shan and Tethys paleooceans in the last cycle of their formation and spreading in the Devonian and Early Carboniferous. Joining, i.e the combination of rigid blocks with each other, is a consequence of compression, caused by oceans in narrow "plastic" zones by A.M. Akramkhodzhaev' theory. Hard ancient blocks account for 75% of the Turan platform territory. Such an interpretation admits the possibility of existence of un-dislocated or poorly dislocated Upper Paleozoic deposits within deep-buried blocs like Srednecaspisky, in the east of which there is the South Mangyshlak system of troughs, namely Zhetybai-Uzensky and Kokumbaisky tectonic steps (figure 1).

This assumption is confirmed by the latest seismic tests carried out in the Zhazgurlinsky trough, that has another three reflecting parallel horizons. They are clearly visible and traced in its Paleozoic section (figure 2) below the reflecting horizon V_3, limited to the roof of the Dolnapinsky group of the Induan stage. The horizons are signaling about the presence of non-dislocated sedimentary Upper Paleozoic deposits. These sedimentary deposits of Paleozoic age and 2500-3000 m thick are considered to be a new, independent and perspective object as for search of new oil and gas deposits in Mangyshlak. We hope that this newly opened new structural floor will open new prospects for the development of oil industry in Mangyshlak.

The history of Mangyshlak oil fields says that in the previous 70s the Triassic deposits were not believed to be very promising in terms of oil and gas exploration and were not duly studied and researched, although some of wells displayed oil and gas occurrence. Industrial gas with condensate from the middle Triassic produced in 1972 at the South Zhetybai area, well 4, interval 3568-3605 m, marked the beginning of planned and targeted study of Triassic deposits (3). Currently, Triassic sediments are one of oilgas bearing and producing complexes in the South Mangyshlak region with dozens of large and medium-sized oil and gas fields discovered, they are the Tenge, Tasbulat, Severnoye Rakushechnoye, Kariman, Dolinnoe, Akkar, Asar, North Karagiye and others. Today subsoil users are conducting targeted prospecting for Triassic deposits.

As for Paleozoic deposits, there, after the Oimash deposit discovery in the previous 1980s, were drilled wells at low relief structures such as Tashkum, Aschysor, Cape Peschany, Zhaga, Zhylandy and SothRakushechny, identified by reflecting horizons in the Triassic. Excavations in the Triassic resulted in the discovery of Paleozoic deposits. Most of wells were aimed at opening weathered and fractured granites

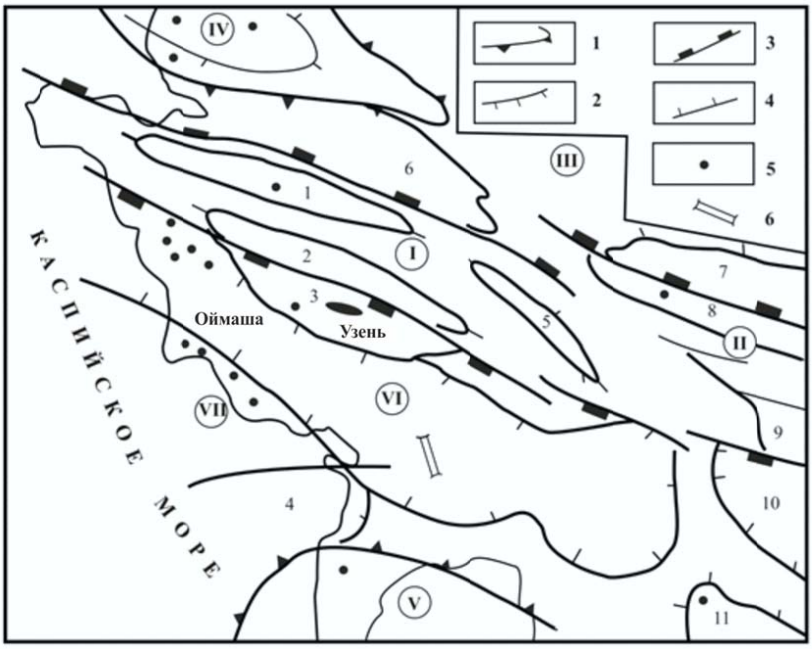

Figure 1 – Tectonic map of Mangyshlak.

Major fold contour (1) and secondary fold conture (2), regional faults (3) and local faults (4), 5 - wells that opened the Paleozoic deposits and the time section line (figure 2).

Dislocation systems I - Central-Mangyshlaksky and II - Central-Ustyurtsky, troughs: III - North Ustyurtsky and IV - Zhazgurlinsky, plateaus: V - Karabogazsky, VI - North-Bozashinsky and VII - Peschanomysko- Rakushechnoe. 1 – Karatau reef and 2 - Bekebashkuduk reef, 3 - Zhetybai-Uzensky tectonic step, 4 - trough of the Kazakh gulf, 5 - Tumchaginsky bar, 6 South-Bozashinsky trough, 7 - Baychagyrsky tectonic block, 8 - Karabaursky arch, 9 - Shahpahtinsky tectonic block, 10 - Assake-Audansky trough, 11 - Kumsebshensky arch.

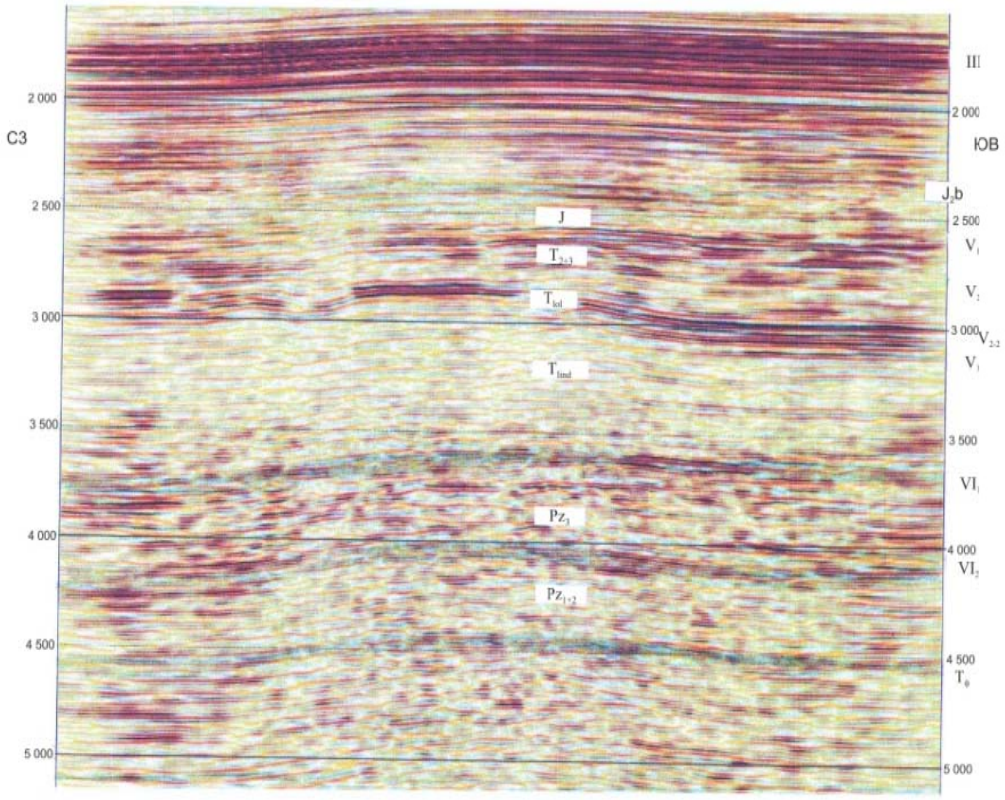

Figure 2 – Time section at Zhazgurlinsky trough by line 1-1 (figure 1), adapted from PGS company (2017)

similar to the Oymash. However, no granite was found in any area, although most of the prospected structures were located in the same structural zone with Oimash i.e. on the eastern slope of the Peschanomysko- Rakushchechny plateau/uplift, characterized with numerous faults, some of which could serve as a channel for effusive manifestations in the Triassic. In short, the history of the Triassic oil & gas bearing complex did not repeat, which excluded Paleozoic deposits from the list of potentially promising for oil and gas. This even caused making a geological task during seismic studies of 2D and 3D. The assignment included making structural maps by the lower reflecting horizon V_3 and/or V_{2IV}, limited, respectively, to the roof of the Induan Stage Redrocks and to the Oleneksky stage carbonates. It is natural that with this technical specification, the companies processed the seismic material until obtaining the info on these index target horizons, usually during 2.5-3.0 seconds, the rest info in the interval of 3.0-6.0 seconds, remained unclaimed by the customer. This is due to geologists who believed that the basement located deeper of horizon V_3 was consisting of highly dislocated and metamorphosed Paleozoic deposits which were supposedly of no interest in terms of oil and gas prospecting.

But new drilling and seismic data from sites where Paleozoic deposits were discovered, show that the geologists supporting the fixist idea about the Hercynian age of both the South Mangyshlak basement and of the entire Turanian platform were wrong.

The new info on the structure of the Paleozoic part of the section at the south Mangyshlak says about its weak dislocation in Zhetybai-Uzensky tectonic stage and its nondislocation within the South-Mangyshlaksky trough zone. This means that it is worth to study Paleozoic deposits as a potentially promising complex as for oil and gas prospecting.

Characteristics & Paleozoic deposits study outcome results. Paleozoic deposits were first identified and described in the nucleus of the Otpansky anticline and in the Karatau arch by A.E.Shlesinger (1965) and A.I. Letavin (1978) in combination of Berkut and Otpaniansunks, composed of gray, bluish-gray mudstones enriched with carbonate material and interlayers of fine sandstones.The age of lower gray-colored rocks from the Berkut sunk is late (possibly even middle), the carbon - is an early Permian, and the Otpansky sunk is late Perm. B.I.Titov (1978) stated about the presence at the South Zhetybay area of charred plant residues in gray-colored sandstones and siltstones with interbeds of dark gray mudstone.

A.P.Pronin and his co-authors (8) have studied in detail the coeval Middle-Upper Carboniferous and Lower Permian deposits by logs of the following parametric wells North-Bozashinsky, North-Karazhanbassky, East-Karaturansky and Arman at the Bozashi half-island. The said deposits are described as dark gray and black mudstones, sandstones with charred plant organics and limestones with detritic, foraminiferal, brachiopodal and fusulinidal.

The Paleozoic deposits are studied within South Mangyshlak area due to drilling mainly the eastern slope of the Peschanomissky-Rakushechny Uplift and the northwestern slope of the Karabogaz uplift. There ar individual wells that excavated Paleozoic rocks in the Zhetybai- Uzensky stage and at the Segindiksky trough.

Today, one of the Oimash oil fields is linked to Paleozoic deposits. In Oimash oil lies in fractured granites and primarily-terrigenous Paleozoic age rocks, that underwent intensive transformations due to the contact metamorphism with intrusion (5). With distance from the intrusion, the thermal effects weaken and the rocks acquire their original sedimentary appearance. This deposit is located in the zone of deep regional fault in which there occurred the granite intrusion, its absolute age is estimated at 250-340 million years (4). A detailed study of core samples showed that the granites are leucocratic, they are dissected by vein bodies and the dykes of diabaseunmetamorphosedporphyrite, also they contain acidic beds that are tearing granites. These observations give grounds to presume that the fractures through which the granite intrusion occurred in the Late Paleozoic were functioning as feeding channels for effusives in the Triassic period also, because tufolavas, acidic tuff breccias and pyroclastic rocks are present in the Triassic section.

According to A.A.Rabinovich (2008), in the 80s of the last century the Paleozoic deposits were excavated by drilling the following locations - Ashisor, Tashkum, MysPeschany, Zhaga, Zhantanat, Zhilandy. Unfortunately, the well logs never been studied in detail in terms of dating the rocks age, nor for their petrographic composition and etc. Their Paleozoic age was dated by the geologists visually. All these structures are located on the eastern slope of Peschanomysko-Rakushechny uplift. The latter is characterized with hard tectonic disturbances, faults and intrusion into them, i.e. it is located in the same

tectonic zone as the Oishash deposit. Most of wells were aimed to find deposits in weathered fractured granites as in Oimash, but none of the wells met granites.

Therefore, according to the results of studying the core taken from the contact zone in Oimash, Zhilandy and other sites located in the fault place, it is incorrect to accept the whole Paleozoic part of the section as metamorphised and ascribe it to the basement. On the contrary, new seismic materials and new rare samples (cores), taken from deep wells, indicate the presence of undislocated or poorly dislocated sedimentary deposits of the Upper Paleozoic age.

In wells 25-P Zhetybai and 4-P South Zhetybai Paleozoic deposits are represented by gray, dark gray and black sandstones, siltstones and mudstones. The log well 25-P is divided into two parts: the lower part that begins at depth of 3950 m to 4501 m, mainly sandy and the upper part being siltstone-argillaceous, has an increased content of carbonized detritus at the depth 3720 m to 3950 m. They are normally sedimentary formations that have undergone post-sedimentation transformations of the Upper Paleozoic age with no signs of metamorphism throughout the whole section. They display the textures of gravitational sliding and underwater turbidity (4), indicating the marine conditions of sedimentation. The total thickness of Paleozoic deposits discovered by this well is 781 m.

Paleozoic dark-gray mudstones, shales and siltstones were opened by wells in locations North Karagie, Aschysor, Atambay, Alatobe, Aksaz. The depth of excavations was not very deep and within the limits of South Mangyshlak troughs system, particularly in the Segyndiksky trough.

Paleozoic part of the North Karagieis the most cored area - 24 core samples from well log #1 at at the interval 3901- 4450 m. They make up dark gray, gray and light-gray greasy feel mudstones, siltstones obliquely fractured with finely dispersed carbonaceous matter interlayedby light gray limestones, organic remains in the shape of pelecypods and black aleuriticschists, sometimes carbonaceous, with pyrite crystals fissured and filled with calcium.

Paleozoic deposits were also studied on the southern side of the Zhazgurlinsky trough – site the NorthRakushechny. Well 12 penetrated Paleozoic deposits at depth of 140 m. According to seismic data, the thickness of the Paleozoic strata in this region is more than 500 m. Paleozoic rocks are represented by gray-colored terrigenous formations - sandstones, gravelites with interbeds of conglomerates and silt-stones. Granite pebbles forming part of conglomerates are aged 320-340 million years, i.e. they represent a product of denudation of lower and medium-carbon intrusions.

The North-Western slope of the Karabogaz uplift at the Bukbash and South Alamurin well sites, terrigenous-carbonate gray - colored rocks have been studied by many researchers. Low-metamorphosed terrigenous rocks - sandstones with interlayed with small-pebble conglomerates and gray, dark-gray color aleuro-argillites, less often black and greenish, with the capacity of 35-40 m. Weathered granites were found in boreholes 2 Bukbash (interval 2943-2960) m and well 1 the South Alamurin (interval 2866-2869) with an absolute age of 335-364 million years (D_3 - C_1). Shales of dark gray color with an absolute age of 278 million years ereoverlaying and were found in well 2, site South Alamurin, shales dated 228 million years in well 1, South Alamurin, which speaks for the Early Permian age of the dark gray terrigenous deposits and that they were affected to a weak metamorphic change in the zone of faults, where it is likely intrusive processes were taking place like at the Oimash field.

The eastern zone of South Mangyshlak trough and its support wells 2 Koombekshen and Alamen (interval 2180-2316 m) also embody sandstones and gray-scale argillites, which can be checked with poorly metamorphosed terrigenous deposits at the Zhetybai-Uzensky step (South-Zhetybaysky area), at the Peschanomyssky uplift (North Rakushechny area). The absolute age of rocks from Kumsebshensky borehole is estimated at 262 million years. (3)

These facts speak for the regional distribution of gray-color terrigenous-carbonate strata on the vast area from Karabogaz to Bozash and throughout the South, Central and East Mangyshlak.

Research data discussion. Comparing the data on Paleozoic deposits collected at different times by different scientists and the data from Mangyshlak wells that discovered Paleozoic and associating the latest data from new wells and modern geophysical investigation methods (gravimetric, magnetometric and seismic), we think it is necessary to point out the following two features peculiar for the structure of these deposits. First they are occasioned by sedimentation conditions on the one hand, and by the influence of subsequent tectonic movements in the Mesozoic Cenozoic on the other hand.

It is beyond question that Paleozoic of Mangyshlak and the entire Ustyurt-Mangyshlaksky region in its structure contains not only "habitual" reddish colors of Permotrias but also gray-colored carbonate-terrigenous sequences of Carboniferous and Lower Permian. The presence in the Paleozoic of subaquatic gray-scale carboniferous sediments of the Carboniferous and Lower Permian formed in anaerobic environment, in a single sedimentary basin that covered the south of North Ustyurt, Central and Southern Mangyshlak up to the Karabogaz arch, affords grounds for presumption that this region, including the South Mangyshlak, possesses sedimentary rocks loosely dislocated and possibly oil-gas bearing.

V.S. Knyazev, P.V. Florensky, A.M. Charygin and others (6) who had been studying the intermediate complex of the Turan plateau, including the Ustyurt-Mangyshlaksky region for more than a decade, not only by outcrops but also by well-logs, noted the following two features of Permian-Triassic sediments, according to the terminology that was used at those times.The first is the complete absence of coarse clastic rocks and the second is the cyclical structure of rock sections. They singled out three regressive cycles, each begins with calcareous clay rocks that were deposited in the transgression period, and ends with reddish siltstone and shale rocks corresponding to the regressive period.

Comparing the sections studied and described by the above-mentioned researchers with the sections from South Mangyshlak, one can conclude that the lower cycle begins with gray and calcareous shales sparsely interlayed with siltstone s from the Berkut sunk, located at the Karatau rift in Central Mangyshlak. Its analogues have been discovered and studied at the Zhetybai-Uzen step of the Segyndiksky depression, Peschanomysky Rise in the South Mangyshlak. Its penetrated thickness is more than 700 m. These deposits correspond to the stage of the lower transgression cycle. Comparing these South Mangyshlak sections with sections of coeval deposits at the adjacent Ustyurt areas, one can conclud that during the period of accumulation of Berkut sunk - it is late or may be middle carbon – the early Perm - the entire territory of the Ustyurt-Mangyshlaksky region represented a single sedimentation basin with a very calm sedimentation conditions, which contributed to the thin erosion of the material and to the formation of gray-colored deposits with an increased content of organic matter.

The regressive stage of the lower cycle begins with the Otpan formation, represented by gray massive sandstones with subordinate interlayers of red-colored siltstones and mudstones. During this regressive stage, there starts to form the Dolnapin sunk, composed of interstratified clay-silty rocks with a subordinate presence of sandstones, containing numerous katunas of red clays and siltstones recycled from local elevated areas against a background of general sedimentation.

Since the Indian Lower Triassic fauna was found in the rocks of the Dolnapin sunk (Vinyukov, 1966), then the regressive stage that began in the late Permian continued in the early Triassic. The formation of red-colored rocks of this stage took place in the desalinated basin with the intensive introduction of detrital material under arid climate.

Judging by the enormous thickness of red-colored rocks in Central Mangyshlak, its rift system was formed precisesly in this regressive stage of the lower cycle, corresponding to the late Permian and Early Indian Triassic, in which avalanche sedimentation was taking place. Precisely from this period under the impact of the initial stage of Mesotetis formation there starts an intensive tectonic development of the Central Mangyshlak and East Mangyshlak systems.

The next transgression, at the beginning of the next cycle, begins from the Olenek times. The period is followed by accumulation of mudstones and limestones of the tartalin sunk, it passes up into Middle Triassic carbonate-terrigenous containing bituminous argillites and ammonites and being a productive oil bearing stratum, to which many now exploitable deposits are confined.

Sediments of the upper Triassic cycle are represented by the Akmyshsky and Torymskysunks or formations. During this cycle, compression and folding accompanied by effusive activity occurred in falt line zones. In place of deep deflection consisting of a twograbens system the Karatau and Bekebashkuduk there was formed a zone of plateaus as a result of their inversion, which subsequently experienced a constant upward tendency up to this day and which radically changed the structural plan of the region, dividing the Ustyurt-Mangyshlak region into two part - Central Mangyshlak and Central Ustyurt dislocation systems.

Paleozoic deposits as a result of tectonic movements have been crushed into linear folds and were strongly dislocated towards the Central Mangyshlakzone.According to seismic study materials, they are weakly dislocated and broken by faults (rock dumping and compression faults) in the Zhetybai- Uzen

structure conture and in zones of development of tectonic disturbances on the slopes of regional plateaus such as Peschanomysko-Rakushechny and Karabogazsky, that underwent intrusions, effusive processes and caused local metamorphic changes in sedimentary rocks. In all other regions of South Mangyshlak, with the exception of narrow zones of contact with deep faults, they are gently dipping or flat-laying. In some places they are broken by low-amplitude faults within tectonic flexures or regional archs, forming structural and lithologically shielded traps.

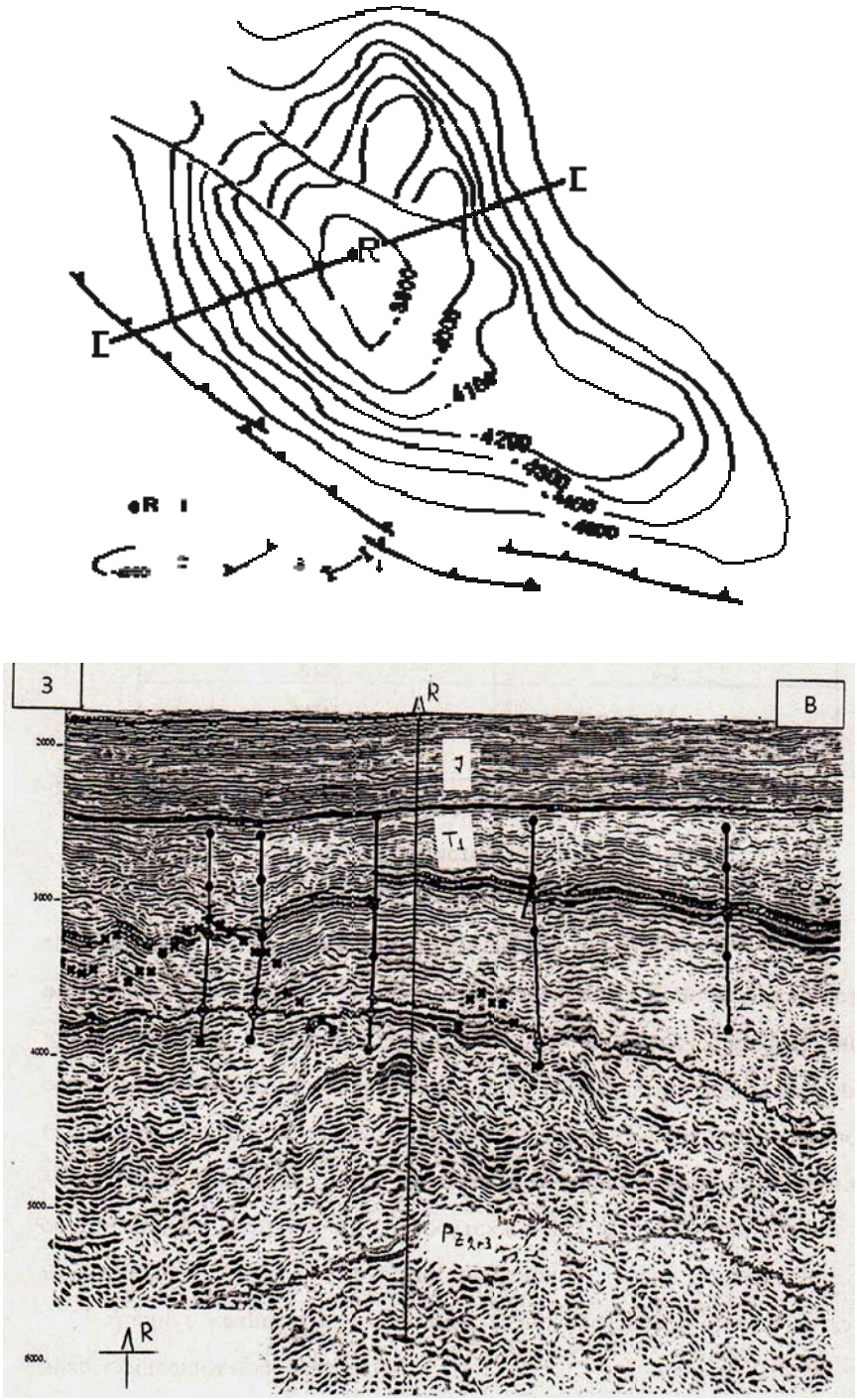

Figure 3 – Structural map for the Ozen-PZ and deep section along line I-I through recommended well:
1 - recommended well, 2 - isohypses along the horizon in Paleozoic, 3 tectonicalfissures, 4 - section line

Geochemical survey results of Paleozoic and oil rocks. P.I.Kuprin, who studied geochemical features of Paleozoic and Permian-Triassic deposits of the South Mangyshlak and Ustyurt, highly appreciates the bitumen-producing properties of the lower gray-color (the Berkut sunk) and the upper gray-colored (Olenek deposits).The lower gray-colored stratum is characterized by the high content of organic matter - 1.3-1.6% at the concentration of chloroform bitumen of 0.0003%. The dispersed organic matter belongs to sapropelites and sapropelitohumites. He classifies the Berkut sunk and Olenek gray-color deposits as bituminous.

Not without interest are research results of oil deposits on the South Mangyshlak, conducted by K.V.Vinogradova, A.M.Medvedeva, L.P.Bagdasaryan, and geological and geochemical studies made by a group of scientists from the IGIRGI institute - K.R.Chepikov, V.A.Chakhmachev and V.I. Kordus (7).

In oils from the Jurassic productive horizons in Uzen and Zhetybay plateaus they opened both Jurassic microfossils and the migratory ones from the more ancient Triassic- Paleozoic deposits. It is specified that the content of migratory microfossils increases in the zone of increased fracturing.

The study of microfossils from Triassic oils and host rock reservoirs at the North Rakushechny and North Karagie deposits showed the presence of both syngenetic Triassic species and migratory coal forms. Carboniferous microfossils are in oils of all stratigraphic levels in the Triassic, Jurassic and Cretaceous, whereas in the reservoir rocks only syngenetic complexes of microfossils are met.

Conclusion. The fact that Jurassic and Triassic oils contain permanent and significant quantities of microfossils of the same age coeval to host rock formations speaks for oil and gas producing capacities of these sediments if there are favorable geodynamic and geochemical conditions. The presence of migratory carbon forms of microfossils in oils of Triassic and Jurassic horizons shows that it is necessary to take into account the importance of vertical migration processes of oils and the possible presence in the section of older deposits with a significant generation potential, i.e. of the possible existence of oil and gas producing massives of the Upper Paleozoic age. This suggests the possibility of formation and conservation of oil and gas accumulations in the Paleozoic part of the section upon favorable conditions, i.e. in presence of pore-cracked reservoirs, zonal covers and traps of various types, including those shielded with discontinuous faults, like in oil North Caucasus deposits, that are confined to folds broken by ruptures. It is possible to admit the existence of similar oil deposits in the Paleozoic deposits of the Zhetybai-Uzensky tectonic plateau. One of the similar structures is the Ozen-PZ. It is prepared by 2D and 3D seismic according to the Paleozoic complex under the Uzen deposit (Fig. 3), and we propose to make a search-parametric drilling at 6000 m deep. In the Paleozoic complex, a deposit similar to the Ciscaucasian deposits is expected to exist and be located in structural tectonically disrupted traps, in pore-cracked reservoirs covered by local and zonal covers. We hope that obtaining positive results in this well will open a new Paleozoic stage in the development of oil and gas industry in Mangyshlak.

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ПАЛЕОЗОЙЛЫҚ ШӨГІНДІЛЕР – МАҢҒЫШЛАҚТАҒЫ МҰНАЙ-ГАЗ САЛАСЫНЫҢ ШИКІЗАТ БАЗАСЫН КЕҢЕЙТУ ЖӘНЕ ҚОРЛАРЫН ТОЛЫҚТЫРУ ӘЛЕУЕТТІ РЕЗЕРВ

Аннотация. Манғыстау түбегінде палеозой жыныстарын ашқан ұңғырлардан алынған деректерді бір-бірімен салыстыра отырып және оларды Қаратау мен Бекебашқұдық тауларында зерттелген беркут және отпан свиталарымен салыстыра отырып олардың бір теңіздік бассейінде жаратылғанын дәлелденген. Ұңғырлардың орналасуына байланысты бұл бассейн жоғарғы карбон және төменгі перм дәуірінде Карабоздан Бозашығы дейінгі үлкен аумақты алып жатқан. Сол кезде жаратылған шөгіндінің геохимиялық сипаттамасы бойынша беркут свитасы табиғаттық жағдайда мұнай мен газ өндіретін қасиетті бар. Екіншіден юра және триас мұнайларының құрамында карбондық микрофоссилийлер көп кездеседі. Бұл деген жоғарғы юра және триас қабаттарына төменнен карбон-пермь қабаттарынан келіп жатқан мұнай бардың дәлелі. Осы деректерге сүйене отырып авторлар бүкіл Манғыстау маңайында палеозой шөгінділерін мұқият зерттеуге шақырады, сейсмикалық 2Д және 3Д әдістерімен дайындалған Озень-PZ_1құрлымда тереңдігі 6000 м ұңғы қазуды ұсынады.

Түйін сөздер: палеозой жыныстарын, теңіздік бассейінде, свиталар, мұнайбардың, микрофоссилийлер

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ПАЛЕОЗОЙСКИЕ ОТЛОЖЕНИЯ – ПОТЕНЦИАЛЬНЫЙ РЕЗЕРВ ВОСПОЛНЕНИЯ ЗАПАСОВ И РАСШИРЕНИЯ СЫРЬЕВОЙ БАЗЫ НЕФТЕГАЗОВОЙ ОТРАСЛИ НА МАНГЫШЛАКЕ

Аннотация. Сопоставляя разрезы глубоких скважин, вскрывших палеозойские породы на Карабогазском и Песчаномысско-Ракушечном поднятиях, Сегындыкском прогибе, на Северо-Бозашинском и Кумсебшенском поднятиях, с разрезами беркутской и отпанской свит на Каратауском валу и Отпанской антиклинали и учитывая новые сейсмические материалы по Жазгурлинскому прогибу, авторы приходят к заключению, что в позднем палеозое – поздний карбон и ранняя пермь на огромной территории Мангышлака и на юге Устюрта существовал единый морской бассейн, в котором накапливались сероцветные карбонатно-терригенные осадки со значительным содержанием ограниченного вещества, т.е. существовали благоприятные палеографические и палеогеодинамические условия для развития нефтегазопроизводящих толщ.

В поздней перми и раннем триасе вдоль Скифско-Туранскогопланетарного линеамента формируется Мангышлакская система рифтов, в которой происходило лавинное осадконакопление красноцветных терригенных пород. К концу триаса рифтовая система претерпевает инверсию и находящиеся в ней палеозойские и нижнетриасовые отложения образуют складки, осложненные разрывными нарушениями, которые картируются на Каратауском и Бекебашкудукском валах.

В пределах Жетыбай-Узеньской ступени палеозойские отложения слабо дислоцированы (Южный Жетыбай) и нарушены взбросами до линии Тенге-Тасбулат. На территории Жазгурлинского и Сегындыкского прогибов палеозойские отложения не дислоцированы, о чем свидетельствуют новые сейсмические материалы и данные по глубоким скважинам, пробуренных в Сегындыкском прогибе.

Результаты геохимических исследований позволяют отнести сероцветные карбонатно-терригенные отложения верхнего палеозоя к категории нефтегазопроизводящих. Присутствие микрофосиллий карбона в нефтях юрских и триасовых горизонтов и их отсутствие в скелетах резервуаров одновозрастных дает основание предположить важную роль вертикальной миграции нефтей и возможное присутствие в разрезе более древних отложений со значительным нефтегазогенерационным потенциалом.

Авторы обращают внимание недропользователей на необходимость изучения палеозойской части разреза на Мангышлакскомосадочном бассейне и предлагают пробурить поисково-параметрическую скважину на структуре Озень-PZ_1, подготовленной сейсмикой 2Д и 3Д.

Ключевые слова: палеозойские породы, морской бассейн,свиты,нефть, газ, толщи, рифты, микрофосиллии.

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