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EDN BAKPCN

УДК 551.248.1

Paleotectonic analysis as a tool for detailed description and refinement of formation structure

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Abstract. Tectonic evolution of some fields in West and East Siberia was studied using thickness history method. This essential method of paleotectonic analysis relies on characteristic thickness variations.

Rock thickness distribution depends on surface subsidence trends. Thickness is defined as the first criterion of paleotectonic features of each geological time.

Key words: *simple isopach method, complex isopach method, paleostructural maps, net-to-gross, lithofacies maps*

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EDN BNPGJK

УДК 550.834

Experience of 5D regularization application in azimuthal processing of seismic data for azimuthal inversion AVAz testing for estimation of fractural reservoir spread areas in Bazen-abalaksky deposits interval

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Abstract. Many seismic data processing algorithms have strict requirements for input data spatial distribution. The most known example of such kind of requirements is regular space distribution of input data for migration. To adjust data in term of space distribution for specific processing or interpretation procedure, different regularization-interpolation algorithms are used. There are two main classes of 3D seismic data regularization algorithms, traditional 3D approaches and multidimensional algorithms, commonly named as "5D regularization".In this paper we, have considered the case of 5D regularization application in sequence of data preparation for azimuthal seismic inversion. We show that, to prepare input data for azimuthal seismic inversion, different 5D regularization parameters definition could be, in this paper we consider two possible options. We propose 5D regularization parameters and dimension definitions, that allow prepare data, better to meet requirements of azimuthal inversion. We show results of azimuthal inversion and exhibition HTI anisotropy estimation.

Key words: *5D regularization, multidimensional Fourier reconstruction, azimuthal processing, azimuthal seismic inversion AVAz, P-impedance, S-impedance, HTI-anisotropy, "fast" velocity, "slow" velocity, compressional wave, shear wave*

For citation: A.P. Pravdukhin, A.V. Shakhov Opit primenenia regularizatsii 5D v azimutalnoy obrabotke seismotazvedochnih dannih dlia oprobovania tehnologii azimutalnoy inversii AVAz s tseliu otsenki vozmoznosti videlenia zon rasprostranenia treshinovatogo kollectora v intrrvale bazenovsko-abalakskogo kompleksa [Experience of 5D regularization application in azimuthal processing of seismic data for azimuthal inversion AVAz testing for estimation of fractural reservoir spread areas in Bazen-abalaksky deposits interval]. Neftyanaya Provintsiya, No. 3(43), 2025. pp. 11-28. DOI https://doi.org/10.25689/NP.2025.3.11-28. EDN BNPGJK (in Russian)

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EDN CXSLOT

УДК 551.7.022

Facial-paleogeographic conditions for the formation of paleogenic sediments of the Kyzylkum

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Abstract. The article examines the paleogeography, paleotectonic and paleoclimatic conditions of sedimentation, and the history of geological development of the Kyzylkum and its surrounding areas during the Paleogene period. The position of the Kyzylkum Desert in the system of sedimentary basins of the Paleogene of Central Asia has been clarified. The patterns of distribution of various types of rocks in the section and space are described. For the first time, the principle of dynamic facies analysis was applied for closed territories, and facies-paleogeographic mapping was carried out. Consequently, a complete cycle of sedimentation stages of the Paleocene and Eocene periods has been determined, reflecting the direction of the evolution of the Paleogene sedimentary basin of the studied area, which further contributes to the development of the territory in a new strategy for predicting the search for promising deposits, manifestations, and mineral deposits.

Key words: *paleogene, deposits, sedimentation, sediment accumulation, section, area, basin, paleogeography, climate, transgression, regression*

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EDN EJOIOL

УДК 551.24(575.16)

Association of permeable zones of deep fluid vertical migration with crustal extension structures (decompaction zones) in the Chardzhou Step of the Bukhara-Khiva region

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Abstract. This article highlights the results of research to identify factors influencing the formation of oil and gas deposits within the Bukhara-Khiva region. Oil and gas accumulation is subject to a certain cyclicity, when the cycles of tectonic development: subsidence, uplift and stabilization of the tectonic regime correspond to cycles of fluid formation and accumulation. The movement of fluids does not occur during periods of downward tectonic movements, but during active upward tectonic movements, during periods of active tectonic activity. With tectogenesis of a positive sign, the mass of strata that have undergone uplift splits into cracks having certain (countable) parameters: direction, orientation, volume, etc. As an example, the article presents the results of structural interpretation of the Shurtan site, which in terms of intensity and depth of dissection differs sharply from the adjacent areas. On the deciphered detailed lineament network of the Shurtan uplift, a number of features of the lineament network were noted, characterizing its high heterogeneity and the special intensity of the new tectonic regime of the field. Supposably, these lineament zones provided vertical migration of gas into the primary porous-permeable reservoirs of the reef massif and possibly formed additional volumes of secondary superimposed zones of tectonic fracturing in dense rocks.

Key words: *lineaments, fluid saturation, faults, fracturing, localization, oil content, structures, seismic, objects*

For citation: L.R. Bikeyeva, Sh.A. Umarov, I.N. Khakimzynov Svyaz' pronitsayemykh zon vertikal'noy razgruzki glubinnykh flyuidov so strukturami rastyazheniya zem-noy kory (zonami razuplotneniya) Chardzhouskoy stupeni Bukharo-Khivinskogo regiona [Association of permeable zones of deep fluid vertical migration with crustal extension structures (decompaction zones) in the Chardzhou Step of the Bukhara-Khiva region]. Neftyanaya Provintsiya, No. 3(43), 2025. pp. 55-68. DOI https://doi.org/10.25689/NP.2025.3.55-68. EDN EJOIOL (in Russian)

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EDN ECFBNZ

УДК 551.7.022

Application of multiattribute analysis in facial modeling

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Abstract. A method for predicting facies in the inter-well space for the Upper-Middle Jurassic strata (U1-U2) of the southeastern Yamalo-Nenets Autonomous District based on a multi-attribute analysis of seismic data is proposed. The approach makes it possible to overcome the lithological heterogeneity of sediments and minimize the subjectivity of interpretation. The results include maps of the distribution of facies, suitable for use as a trend in 3D geological modeling.

Key words: *facies, multi-attribute analysis*

For citation: Y.V. Mikheev, A.I. Kudamanov, A.R.Aflyatonova, S.V. Shabakova, A.V. Arkhipov, S.V.Permyakov, A.I. Politova, A.A.Snokhin, A.V. Permyakov, N. Y. Natchuk Primenenie mul'tiatributnogo analiza pri facial'nom modelirovanii [Application of multiattribute analysis in facial modeling]. Neftyanaya Provintsiya, No. 3(43), 2025. pp. 69-91. DOI https://doi.org/10.25689/NP.2025.3.69-91. EDN ECFBNZ (in Russian)

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EDN ULPGIZ
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Evidence of pulsed sedimentation during the Late Cretaceous in the northern part of the West Siberian Plate

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Abstract. The Upper Cretaceous gas-bearing deposits of the West Siberian Plate, which are predominantly pelitomorphic and cover an area exceeding 2 million km², exhibit a cyclic structure comprising up to 10 cycles of sedimentation, each with a duration of 3-3.5 million years. Based on the results of areal studies above the Cenomanian stage, four horizons or seismic sequences have been identified, including the Turonian-Lower Coniacian (Kuznetsovsky), Coniacian-Santonian (Nizhneberezovsky), Campanian (Verkhneberezovsky), and Maastrichtian (Gankinsky). Based on core data and well log data, smaller stratigraphic units have been identified within these seismic sequences. One-dimensional isopach maps have been generated for seismic sequences and individual stratigraphic units. Using a local area (35×50 km²) with a code name "Severny" (Northern) located in the northern part of Western Siberia as an example, the effect of low-amplitude tectonics on sedimentation of individual stratigraphic units has been analyzed. The isopach map analysis has shown some evidence of predominant transgressive or regressive development of the local area. These features are most distinctly expressed within a zone of en echelon faults feathering a deep-seated fault. The transgressive-regressive cyclicity of the Upper Cretaceous sequence in Western Siberia reflects the pulsating nature of low-amplitude tectonic movements during the global Late Cretaceous transgression.

Key words: *Upper Cretaceous deposits in Western Siberia, stratigraphic units, earth silicon, smectites, en echelon faults, transgression, regression*

For citation: A.I. Kudamanov, T.M. Karikh, A.M. Moshkov Sledy pul'satsiy pozdnemelovogo osadkonakopleniya v severnoy chasti Zapadno-Sibirskoy plity [Evidence of pulsed sedimentation during the Late Cretaceous in the northern part of the West Siberian Plate]. Neftyanaya Provintsiya, No. 3(43), 2025. pp. 92-111. DOI https://doi.org/10.25689/NP.2025.3.92-111. EDN ULPGIZ (in Russian)

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EDN GDEPLG

УДК 552.578.1+553.98(470.56)

Search for causes of gas shows in Severo-Yeltyshevskoye field

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Abstract. Causes of gas shows in Severo-Yeltyshevskoye field were analyzed based on detailed study of field geological structure considering complex behavior of its development, evolution and deposition of organic sediments, as well as tectonic factors. The Peri-Caspian Depression formed under conditions of continuous intense subsidence and extensive sedimentation with presence of Lower Permian salt-bearing formation that divides the entire section into presalt and postsalt units. The authors believe, that the sedimentary rocks with organic deposits, most heavily exposed to the subsidence, have become the sources of hydrocarbons formation for a substantial part of southeast Russian Plate; discontinuity of this process has resulted in structural heterogeneity and formation of a wide range of various facies.

Analysis of geological conditions presented in this paper suggests that increased concentrations of non-hydrocarbon compounds in oil and gas are associated with carbonate rock distribution zones, mainly in basins whose sedimentary cover comprises thick, fully developed salt-bearing formations; such formations cause anomalous distribution of geobaric, geothermal and hydrochemical fields, which, in turn, leads to anomalies in the composition of hydrocarbon fluids filling the traps in salt-bearing basins.

The authors analyze the physical trends in evolution of nitrogen solubility accounting for the partial pressure in the atmosphere and gas caps. Depending on specific conditions, nitrogen absorption by water and its release (liquid gas liberation) can take place.

As evidenced from well drilling data, nitrogen gas shows are confined to salt-bearing rocks in hydrochemical sediments, while the transition of dissolved gases into free phase often results from inversion movements during formation of the Peri-Caspian Depression and from decompressions of formation water due to geological reasons in the course of field development. Moreover, ingress of formation brines in subsalt rocks increases the salinity of formation water and reduces gas solubility facilitating release of the latter into free phase.

***Key words**: nitrogen show, subsalt horizon, near edge zones, groundwater, gas accumulations, Pre-Caspian Depression, hypsometry*

For citation: N.V. Grigoriev, A.A. Faizullina, A.E. Fedorova Poisk prichin gazoproyavleniy na Severo-Yeltyshevskom mesterozhdenii [Search for causes of gas shows in Severo-Yeltyshevskoye field]. Neftyanaya Provintsiya, No. 3(43), 2025. pp. 112-122. DOI https://doi.org/10.25689/NP.2025.3.112-122. EDN GDEPLG (in Russian)

DOI: https://doi.org/10.25689/NP.2025.3.123-137

EDN YEKWIW

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Methods of oil saturation cube generation: advantages and disadvantages

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Abstract. Adequate presentation of the initial oil saturation cube during geomodelling and reservoir simulation is one of the most critical tasks, as it provides the basis for estimating the initial and remaining oil reserves in a productive formation. This paper analyzes the existing methods for generating the initial oil saturation cube during reservoir simulation, highlighting their advantages and disadvantages. The study provides a detailed discussion of various methods of the initial oil saturation distribution based on well log interpretation data, as well as principles of the initial oil saturation cube generation using the Leverett J-function. A comparative evaluation of the results from generating the initial oil saturation cube by these methods was performed. It has been found that considering such factors as reservoir porosity and permeability, and capillary forces enables generating a more physically representative initial oil saturation cube.

Key words: *geological modeling, reservoir simulation, saturation model, initial oil saturation, connate water saturation, capillary forces*

For citation: R.R. Khasanov, D.V. Yeremeev Metody postroyeniya kuba nasyshcheniya: preimushchestva i nedostatki [Methods of oil saturation cube generation: advantages and disadvantages]. Neftyanaya Provintsiya, No. 3(43), 2025. pp. 123-137. DOI https://doi.org/10.25689/NP.2025.3.123-137. EDN YEKWIW (in Russian)

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EDN SONSFX

УДК 552.578.1(575.1)

Research and analysis of new data on sweet gas from the Dayakhatyn field within the Gugurtli-Uchkyr swell of the Bukhara-Khiva oil and gas region

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Abstract. This article is devoted to the study and analysis of new data on sweet gas from the Dayakhatyn field within the Gugurtli-Uchkyr swell of the north-western part of the Bukhara-Khiva oil and gas region.

The objective of the study is to carry out an analysis based on new data on sulfur-free gas obtained from the Dayakhatyn field within the Gugurtli-Uchkyr swell of the Bukhara-Khiva oil and gas region to identify new fields in this region.

The article considers the issues of the theory of deep origin of oil and gas on the example of the Dayakhatyn field within the Gugurtli-Uchkyr swell. An analysis of current issues of the theory of deep origin of oil and gas by leading scientists of Russia and Uzbekistan is presented. An analysis of scientific research in the field of production of sulfur-free gas on horizons overlying productive ones, namely, Neogene-Quaternary, Paleogene, Upper and Lower Cretaceous deposits is given.

Based on gas chromatographic analysis of new data in the composition of gases of the Dayakhatyn field, scientific results were obtained with the presentation of geochemical indicators of gases. Based on the generally accepted classification of I.S. Starobinets (1983), for the first time, a classification of gases as dry, low-nitrogen and low-carbon dioxide was performed.

Based on the results of the conducted research and the obtained results, the article presents findings and conclusions that are of great scientific interest to a large circle of scientists and specialists in the oil and gas sector.

Key words: *sweet gas, hydrocarbons, oil and gas formation, oil and gas accumulation, field, non-biogenic origin of oil, gas chromatographic analysis, well, geochemistry, Dayakhatyn, Gugurtli-Uchkyr swell, Bukhara-Khiva oil and gas region*

For citation: M.Kh. Iskandarov, N.M. Kabilov, Sh.A. Umarov, M.T. Khannanov Issledovaniye i analiz novykh dannykh bessernistogo gaza po mestorozhdeniyu Dayakhatyn v predelakh Gugurtli-Uchkyrskogo vala Bukharo-Khivinskogo neftegazonosnogo regiona [Research and analysis of new data on sweet gas from the Dayakhatyn field within the Gugurtli-Uchkyr swell of the Bukhara-Khiva oil and gas region]. Neftyanaya Provintsiya, No. 3(43), 2025. pp. 138-149. DOI https://doi.org/10.25689/NP.2025.3.138-149. EDN SONSFX (in Russian)

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EDN NMWBPO

УДК 622.276.031:532.5

Rough consideration of changes in formation and oil compressibility during unsteady-state flow

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Abstract. Existing software packages for reservoir simulation, production analysis, and well test interpretation rely on linear and, much less often, exponential dependences of porosity on pressure. Various studies, including those conducted by Terzaghi K., suggest a logarithmic pressure dependence of porosity and hence inverse relationship between formation compressibility and pressure. Similar pressure dependence is observed for various oils according to Vasquez M., Beggs H.D. In light of the above, a rough algorithm for estimation of diffusivity equation is proposed and tried out with account of inverse pressure dependence of compressibility, the order of proportionality coefficients for oil and rock is defined. Estimation results suggest that should the factor under current discussion be neglected, then erroneous overestimation of skin factor, underestimation of permeability, and substantial underestimation of the distance to formation boundaries are observed. The latter point is the most important for reserves estimation based on well test data from wildcat and exploratory wells. The main differences from linear flow are defined by contrasting compressibility factor and inverse function of compressibility versus pressure. The most pronounced effect from the proposed approach compared with linear flow is observed for high oil and formation compressibility and large pressure drawdowns.

Key words: *diffusivity equation, well tests, compressibility versus pressure, porosity, oil, rock, pressure*

For citation: V.A. Iktissanov, A.V. Iktisanov, M.S. Bernatov Priblizhennyy uchet izmeneniya szhimayemosti kollektora i nefti pri neustanovivsheysya fil'tratsii [Rough consideration of changes in formation and oil compressibility during unsteady-state flow]. Neftyanaya Provintsiya, No. 3(43), 2025. pp. 150-169. DOI https://doi.org/10.25689/NP.2025.3.150-169. EDN NMWBPO (in Russian)

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EDN OAZNLR

УДК 622.276.031:550.822.3

Brittleness of rocks in the section of the Gydan (Western Siberia)

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Abstract. Understanding the mechanism of fracture formation under loading is important for developing hard-to-recover reserves using hydraulic fracturing. The destruction of brittle rocks allows the formation of a branched network of conductive cracks with a significant contact area, which increases both the coverage coefficient and the productivity index. Thus, preliminary assessment and forecast of rock fragility in the section and over the reservoir area allow optimizing drilling schedules and hydraulic fracturing designs. This article presents the results of assessing the brittleness index of terrigenous deposits of the Tanopchinskaya, Akhskaya and Malyshevskaya formations in the north of Western Siberia. The results of volumetric compression of the core under thermobaric conditions (TBC) were used as the main source of information for the calculations. The brittleness indices were assessed using various methods: based on the mineral composition of core samples; according to acoustic studies and elastic moduli; according to loading experiments. Analysis of the results obtained by various methods allowed to draw conclusions about the interrelation of the characteristics.

Key words: *geomechanics, elastic properties, brittleness index, destruction, fracturing, elasticity and plasticity*

For citation: S.S. Kuzmina, M.D. Subbotin, N.A. Pavlyukov Khrupkost gornyh porod v razreze Gydanskogo poluostrova Zapadnoj Sibiri [Brittleness of rocks in the section of the Gydan (Western Siberia)]. Neftyanaya Provintsiya, No. 3(43), 2025. pp. 170-185. DOI https://doi.org/10.25689/NP.2025.3.170-185. EDN OAZNLR (in Russian)

DOI: https://doi.org/10.25689/NP.2025.3.186-205

EDN HRRKCP

УДК 622.276.66

Systematization of the results of 1D geomechanical modeling for the unification of hydraulic fracturing designs at the facilities of RN-Nyaganneftegaz

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Abstract. Using the example of terrigenous formations of the Vikulovkskaya (VK), Tyumenskaya (SK) and Bazheno-Abalaksky complex (BAK) of the Krasnoleninsky oil and gas condensate field, the paper describes an approach to building one-dimensional geomechanical models with subsequent systematization of modeling results based on cluster analysis.

Special attention is paid to the analysis of the area distribution of the key characteristics (stress, Young's modulus, Poisson's ratio) of the rock mass and taking into account the vertical anisotropy of the medium affecting the parameters of hydraulic fracture (FRACKING) development.

Based on the results of the analysis, a library of area-averaged elastic properties and stresses for hydraulic fracturing simulators has been formed, which makes it possible to quickly build a discrete geomechanical model based on reservoir pressure data and the well logging interpretations.

Comparison of modeling results (continuous profiles) and library (discrete) geomechanical models based on planned designs and subsequent verification of the actual hydraulic fracturing data demonstrate high convergence of design and actual parameters.

Key words: *geomechanics, hydraulic fracturing, hydraulic fracturing design development, data clustering, library of geomechanical properties*

For citation: B.N. Nedomovnyi, M.I. Samoylov, N.A. Pavlyukov Sistematizatsiya rezul'tatov 1D geomekhanicheskogo modelirovaniya dlya unifikatsii dizaynov GRP na ob"yektakh AO «RN-Nyagan'neftegaz» [Systematization of the results of 1D geomechanical modeling for the unification of hydraulic fracturing designs at the facilities of JSC «RN-Nyaganneftegaz»]. Neftyanaya Provintsiya, No. 3(43), 2025. pp. 186-205. DOI https://doi.org/10.25689/NP.2025.3.186-205. EDN HRRKCP (in Russian)

DOI: https://doi.org/10.25689/NP.2025.3.206-223

EDN YJPMWU

УДК 622.276.5.001.5

Well testing: causes of missing hydraulic fractures diagnostic signatures on pressure buildup curves

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Abstract. The paper presents the results of well testing of a reservoir subjected to hydraulic fracturing (HF). Pressure build-up recorded is some wells with HF showed no characteristic response of the presence of any fractures. At the same time, the effectiveness of HF could be confirmed by increased production rates and a negative skin factor determined by well test result analysis. To determine the cause of such behavior, a literature review and analysis of influencing factors were conducted. It was found that the main issue masking the diagnostic response is a high mechanical skin effect caused by either incomplete fracture propagation or damage to fracture face zone. It was concluded that the primary reasons for this phenomenon may be related both to the hydraulic fracturing technology itself and to the chemical of the fluids used during the treatment.

Key words: *well testing, pressure buildup curve, hydraulic fracturing, skin effect*

For citation: T.A. Abramov, A.Sh. Akkerman, A.N. Kiselyov Analiz prichin otsutstviya diagnosticheskih priznakov treshchiny gidrorazryva na kvd [Well Testing: Causes of Missing Hydraulic Fractures Diagnostic Signatures on Pressure Buildup Curves]. Neftyanaya Provintsiya, No. 3(43), 2025. pp. 206-223. DOI https://doi.org/10.25689/NP.2025.3.206-223. EDN YJPMWU (in Russian)

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EDN MKLDMP

УДК 628.32

Results of field tests of a hydrocyclone wastewater treatment plant

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Abstract. In modern conditions, the relevance of searching for alternative technologies and equipment for treatment of produced water (APW) is significantly increasing. Traditional methods, such as gravity settling, do not always provide the necessary degree of purification, which requires the introduction of more effective solutions. One of the promising directions in this area is the use of hydrocyclone plants, the principle of operation of which is based on the separation of liquid components due to the centrifugal force arising inside the plant. The purpose of this study is to determine the possibility of using a hydrocyclone unit for purification of produced water and to assess its effectiveness in the conditions of the field facility. The article presents the results of pilot tests, which demonstrate the possibility of significant reduction of oil concentration. The obtained data have practical value and can be used in water treatment systems at oil producing enterprises.

Key words: *water treatment technology, produced water, oil concentration, hydrocyclone unit, centrifugal force*

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EDN RLOQSZ

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Technical aspects of using a roller reamer as a support-centering element of a drill string

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Abstract. The article discusses the practical effectiveness of support-centering elements in constructing directional wells, focusing on the advantages of a roller reamer that reduces torque in the lower part of the drill string due to its decreased contact area with the rock formation. This enhances drilling quality and borehole shaping, ensuring stable operation and reducing load on the wellhead, making the reaming a promising tool for modern drilling technologies.

Key words: *oil, gas, drilling, stabilizer, roller stabilizer, roller reamer*

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EDN WDMUPC

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Basic calculations of technological parameters for the installation of grouting bridges for isolation of complicated intervals

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Abstract. In the process of drilling oil and gas wells, abnormally low reservoir pressures (ANPD) and abnormally high reservoir pressures (AVPD) occur mainly in highly permeable, highly porous, highly drained sediments or in the productive part of the well section, where drilling is complicated due to the difficulty of selecting appropriate drilling fluids to create the necessary back pressure on the formation to avoid leaving flushing liquids into the reservoir from partial to catastrophic in nature or by oil and gas events. This article is devoted to one of the most pressing issues in the field of oil and gas well drilling, where geological complications associated with catastrophic waste of drilling fluids and oil and gas occurrences, which are costly, are common. For effective isolation of geologically complicated intervals, a new method of installing grouting bridges is proposed, where all operations will be carried out by specific calculations to determine the main technological parameters. The calculations were performed using the actual data from well No. 90 of the Kokdumalak gas and oil field in the Bukhara-Khiva oil and gas region of the Republic of Uzbekistan.

***Key words**: bridge installation calculation, geological complication, drilling fluids, oil and gas occurrence, catostrophic care, laboratory research, well, technological parameters*

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Assessment of the influence of well design and reservoir properties parameters on the horizontal gas wells productivity

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Abstract. The article considers the problem of determining the performance of a gas horizontal well. An analysis of existing national and foreign scientific works on the stated problem of gas inflow modeling is carried out. The obtained mathematical model is presented, and consists of an equation of gas inflow from a reservoir, based on the theory of single source potential, and an equation of gas flow through a pipe. A joint solution of these two equations allows one to determine the gas well flow rate, build the velocity and a bottomhole pressure profiles. A comparison of the calculation results with the deliverables provided by the tNavigator software package is performed, showing a good convergence. The proposed methodology, implemented in a calculation program, can be used to conduct multi-variant calculations and select the operating mode of a gas well.

Key words: *gas reservoir, horizontal well, homogeneous anisotropic formation, wellbore trajectory, developing flow, pressure distribution, flow resistance, steady state, well performance, reservoir properties*

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