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**RESULTS OF INTERNATIONAL RESEARCH-TO-PRACTICE CONFERENCE
«HYDROCARBON AND MINERAL RESOURCE POTENTIAL OF CRYSTALLINE
BASEMENT» AND STEPS TO SPEED UP USING THIS POTENTIAL**

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Abstract. The paper analyzes the results of the international research-to-practice conference, reviews the best practices of search, exploration and development of hydrocarbon reserves found in the Earth's crystalline basement. The problems concerning the origin and synthesis of hydrocarbons, forming and re-forming of oil and gas fields, hydrocarbons' deep inflow, and the effect of these processes on the development of fields in the sedimentary mantle have been considered. Innovative approaches to development of hydrocarbon reserves considering for the processes of continued degassing of the Earth and replenishment of mature fields with hydrocarbons have been shown. Practical steps to use hydrocarbon fields' re-forming processes have been indicated. First-priority tasks have been defined to solve E&P problems bearing in mind a close connection between the processes of production of reserves and degassing of Earth and contribution of the crystalline basement to development of fields in the sedimentary mantle.

Key words: *origin and synthesis of hydrocarbons, forming and re-forming of oil and gas fields, degassing of Earth, criteria for search, exploration and development of fields in crystalline basement, role of crystalline basement in forming and re-forming of oil and gas fields in sedimentary mantle, innovative development approach, conceptually new geologic models.*

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CURRENT STATE AND STRUCTURE OF HYDROCARBON RESERVE BASE IN UZBEKISTAN

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Abstract. The paper reviews the existing hydrocarbon reserve base structure in Uzbekistan. Data is given on the number of discovered oil and gas fields and their distribution over the petroleum regions. Exploration results are presented for two periods, before 1991 and from 1991 to the present day. The paper discusses contribution of incremental hydrocarbon reserves to production from different fields containing various amounts of reserves and in various periods of time. The authors make a short-term forecast for hydrocarbon reserves production and increment.

Key words: *field, oil, gas, petroleum regions, hydrocarbons, hydrocarbon reserves increment, production*

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**STATUS OF MINERAL RESERVES REPLACEMENT PROGRAM 2017-2021 OF
AO UZBEKNEFTEGAZ**

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Abstract. The paper briefly reviews the results of petroleum exploration activities in Uzbekistan. Data is given on the number of oil and gas fields discovered during the whole exploration period, which were classified by the type of fluid and petroleum regions. The paper presents geologic exploration forecast and expected results for the period of 2017-2021, as well as its actual execution and the results obtained for the period of 2017-2018 and 7 months of 2019.

The most promising areas have been identified for oil and gas prospecting. The authors emphasize the essential role of research in exploration survey and the results obtained. They conclude that Uzbekistan's subsoil assets have great hydrocarbon potential and deem it expedient to continue prospecting for oil and gas.

Key words: *field, regions, oil, gas, exploration, hydrocarbons, reserves increment, seismic survey, well*

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MAJOR ASPECTS OF GEOCHEMICAL FEATURES OF ORE-BEARING SHALES IN UZBEKISTAN

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Abstract. The paper considers analysis of current status of available oil shale reserves in the Republic of Uzbekistan, an overview of oil shale fields is presented. The paper highlights peculiar characteristics of oil shales, which enable to consider them as a promising source of mineral raw materials for various industries that is of current interest. The paper provides a detailed description of geochemical features of Uzbekistan oil shales, which contain not only hydrocarbons but also rare-earth and platinum-group metals. A case study enabled determination of the chemical composition of Baysun and Sangruntau oil shales. Analysis was conducted using Elan DRCII ICP mass spectrometer to determine the composition and distribution of metals in oil shales. Analysis revealed the presence and content of elements, such as Mo, Re, V, Ni, Te, U, Pt, Pd, Au, Ag, Se, As, Cd, Sb, Bi, as well as rare-earth metals. Baysun shales exhibited higher Te, Au, Cd, Hg, V, U content and clarke concentrations, while Sangruntau shales contained more Se, Mo, Au, and Re. Different laboratory method were used to determine metal content in Sangruntau shales. Literature analysis has demonstrated that some authors pay serious attention to adsorption of metals by organic matter, clays, apatite, ferrum oxide and others. They propose two borehole mining methods: in-situ coal gasification and in-situ metal leaching. Comparative analysis revealed advantages and disadvantages of in-situ coal gasification and in-situ metal leaching technologies.

Mineralogical and geochemical studies provided important results and conclusions. Palaeogene Sangruntau and Baysun oil shales were found to differ substantially from their world analogs in terms of Mo, V, U, Re, Bi, Sb, Cd, Ni, Se, Fe, Tl, Au, Ag, Cu, Zn, Pb, Pd, Pt, Hg and rare-earth metal content. Comprehensive development of metal-bearing oil shales in the Republic of Uzbekistan presents apparent interest for expansion of fuel and energy balance as well as radioactive and rare-earth metal stocks.

Key words: *oil shales, fields, geochemical features, rare earth metals, platinum-group metals, chemical analysis, chemical composition, technology, in-situ coal gasification, in-situ metal leaching, diagenesis, genesis*

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**ASPECTS OF GEOLOGICAL MODELING OF UPPER JURASSIC CARBONATE
RESERVOIRS IN BUKHARO-KHIVINSKY PETROLEUM REGION**

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Abstract. Today, the major portion of hydrocarbon production comes from carbonate reservoirs. Despite numerous papers addressing carbonate reservoir studies, reliable estimate of hydrocarbon reserves and planning of carbonate reservoir development are still associated with high risks.

The paper discusses various approaches to geologic modeling and reserves estimate in carbonate formations applied by OOO Lukoil Uzbekistan Operating Company, which take into account basic uncertainties, allow minimizing risks and increasing project efficiency.

The paper analyzes facies features of Jurassic carbonate formation in Bukhara-Khivinsky petroleum region, presents facies modeling results, describes procedure of evaluating reservoir geology and engineering project development, as well as Proxy-simulation tool used for probabilistic estimate.

Key words: *carbonate reservoirs, reservoir properties, heterogeneity, depositional environment, limestone lithogenic type, petrophysical classes, facies modeling, Reservoir Engineering Status concept, Proxy-simulation, probabilistic-statistical estimate*

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**LESSONS LEARNED FROM LABORATORY CORES ANALYSIS FOR
DETERMINATION OF STORAGE CAPACITY OF UNCONVENTIONAL POST-
CENOMANIAN UPPER CRETACEOUS RESERVOIRS**

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Abstract. For replenishment of mineral reserves and resources through bringing into production new oil and gas fields, oil and gas companies actively study and develop hydrocarbon deposits that were not previously considered promising. This is particularly the case with unconventional post-Cenomanian Upper Cretaceous reservoirs.

The purpose of this study is to present development and advances in core analysis of poorly consolidated and unconsolidated Upper Cretaceous post-Cenomanian rocks for determination of reservoir porosity.

Key words: *unconsolidated and poorly consolidated core, reservoir quality, special core analysis, nuclear magnetic resonance (NMR).*

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SUBSTANTIATION OF A REASONABLE DEVELOPMENT SCENARIO FOR CARBONATE OIL RESERVOIRS

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Abstract. To substantiate the optimum development scenario the paper presents analysis of actual well performance data from wells drilled as part of slim-hole infill drilling project in the Bashkirian stage of Vishnevo-Polyanskoye field followed by reservoir simulations and economic estimates.

Key words: *waterflooding, oil recovery factor, well spacing, infill drilling project, slim holes, development scenario, production decline curve, fracture closure pressure, critical deformation pressure, overburden pressure.*

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**SELECTION OF APPROACHES TO COST-EFFECTIVE DEVELOPMENT OF
UNCONVENTIONAL RESERVES BY EXAMPLE OF OIL FIELDS IN PUROVSK
REGION**

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Abstract. The paper addresses the problems of development of unconventional hydrocarbon reserves in high-pressure formations. The examples are from oil fields in the Purovsk region of the Yamalo-Nenets Autonomous District. The paper presents geological characteristics of tight oil reservoirs Ach₂, YuG₂, YuG₄, and discusses the selection criteria for the best practices to ensure cost-effective development of oil fields.

Key words: *unconventional hydrocarbons, abnormally high pressure, cost effectiveness, best production scenario.*

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EXPERIENCE IN THE DEVELOPMENT OF CARBONATE DEPOSITS WITH ACTIVE WATER-OIL ZONE

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Abstract. The issue of maximizing oil recovery from carbonate deposits containing active water-oil zone is one of the main challenges that the oil industry is facing currently. It is common knowledge, that the main problem associated with the development of production targets with water/oil contact zones is premature high water-cut production with resultant decrease in economic life of wells and reduction of oil recovery factor. The nature of premature water cut growth is attributable to well-developed fracture network penetrating oil-and-water saturated intervals of carbonate reservoirs [1-4].

Key words: *waterflooding, oil recovery factor, well spacing, production decline curve, maximum allowable injection bottomhole pressure, fracture closure pressure, dual completion, pilot development, overburden pressure, induced cavern, horizontal well, relative cleanout efficiency.*

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ANALYSIS OF PRODUCTION DATA OF HORIZONTAL OIL WELLS FOR DETERMINATION OF RESERVOIR FLOW PARAMETERS

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Abstract. The main issue in conducting well tests in horizontal wells involves challenges in determination of late radial flow using pressure transient technique and, consequently, accuracy of reservoir data and well parameters. Oil production losses during longer shutdown periods for pressure build-up analysis should also be noted. The paper present the results obtained from interpretation of production decline curves of horizontal oil-production wells (long-term bottomhole pressures and production data) used to determine reservoir flow properties and well parameters. These results are compared with interpreted pressure build-up test data. Conclusions on the applicability and further advancement opportunities of this method are made.

Key words: *well testing, pressure build-up curve, production data analysis, pressure curves, horizontal oil wells.*

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**PAY INTERVALS DETECTION BY NEURAL NETWORK ON THE EXAMPLE OF THE
BV10 RESERVOIR OF THE SAMOTLOR OIL FIELD**

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Abstract. This paper is devoted to the applicability analysis of the neural network usage for automatic pay intervals detection. Machine learning methods allow the fastest way to process large data arrays, as well as to identify the necessary signs and relationships. The problem of this work is to find the optimal neural network, which will most accurately determine the pay intervals using well logs data. To obtain an accurate result, one of the most significant aspects is the preparation of data for the study. Preprocessing of data is a prerequisite for any method of machine learning. The results obtained were compared with the results of geoscientist`s interpretation. The selected algorithm allows automating the process of pay zones detection.

Key words: *Machine learning, neural network, pay intervals detection, sequence analysis, data preprocessing*

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STUDYING THE EFFICIENCY OF WATERFLOOD DEVELOPMENT OF CARBONATE DEPOSITS

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Abstract. The problem of oil recovery from carbonate reservoirs is one of topical issues for research due to depletion of oil reserves in terrigenous reservoirs and low production rates in the prolific carbonate reservoirs accompanied by poor extent of field development drilling activity. In light of the above, opportunities for sustaining and incrementing oil production in the Republic of Tatarstan are associated with bringing into production the carbonate reservoirs. Hence, lessons learned from implementation of waterflooding in carbonate rocks are crucial for improvement of field development practices.

Key words: *waterflooding, oil recovery factor, well spacing, production decline curve, maximum allowable injection bottomhole pressure, fracture closure pressure, dual completion, pilot development, overburden pressure.*

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**ASPECTS OF OIL RECOVERY ESTIMATION TO IMPROVE EFFICIENCY
OF MATURE FIELD DEVELOPMENT SYSTEM IN CASE OF FACIES
HETEROGENEITY**

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Abstract. The late stage of field development is characterized by reserves depletion; therefore, achievability of ultimate recovery becomes a topical issue. Generally, oil recovery efficiency is estimated for the entire field without due regard for geologic aspects and deposition environment. To enhance the development system efficiency it is necessary to know the achievable rate of oil recovery. Based on actual tendencies, ultimate recovery achievability is analyzed using analytical calculations and a reservoir simulation model which relies on the detailed study of reservoir rock formation process. The required actions and their scope are defined.

Key words: *facies, sweep efficiency, compartmentalization, well spacing, reserve recovery, production rate*

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INCREASE OF OIL RESERVES PRODUCTION FROM NEOCOMIAN LAYERS BY THE COMPLEX OF TECHNOLOGIES

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Abstract. A distinctive feature of the fields of Western Siberia located in the late stage of development is the high water content of the products. The technological policy of the subsoil user is to apply relatively “not costly” methods to limit water inflows. Allowing, without additional economic costs, to reduce water cut, leading to an increase in oil production. This list includes: flow diverting technologies, including alignment of the injectivity profile of injection wells; repair and insulation works in production wells, hydrodynamic methods, in particular forced fluid withdrawal, cyclic flooding.

In this paper, we consider the technology of the use of flow diverting reagents that can increase the volume of hard-to-recover reserves not involved in the development. The analysis of the efficiency of injection of gelling compositions into injection wells is carried out. The calculation of additional oil production from the use of flow diverting technologies is carried out. The estimation of the duration of the effect of applying this technology is calculated.

Key words: *oil recovery enhancement methods, water cut, fluid flow rate, well, reagent, water flooding, reserves, reservoir, hydrocarbons.*

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**CALCULATION OF PRODUCTION PERFORMANCE OF BUREIKINSKOYE OIL
FIELD BASHKIRIAN RESERVOIRS BASED ON SIMULATION MODEL**

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Abstract. The paper describes the process of creation of geologic and reservoir models of the Bashkirian reservoirs. Oil and water historic production data, and well data have been collected and analyzed. The paper presents geological description of the Bureikinskoye field and analysis of the current development status. The model has been validated through the historic production data. History matched results were used to predict future performance of the Bashkirian reservoirs. A good agreement between the modeled and the actual data was obtained. A development scenario involving production enhancement operations was considered.

Key words: *oil field, oil reserves, geologic and reservoir model, oil recovery, residual oil saturation, net pay, structural framework, model history matching, water cut cutoff*

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ANALYSIS OF PRESSURE TRANSIENT TEST RESULTS FOR BERYOZOVSKAYA SUITE

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Abstract. The paper presents a summary of pressure transient test results for Beryozovskaya suite of NK Rosneft's oil, gas and condensate field. Based on pressure transient test results for Upper-Beryozovskaya subsuite, it contains terrigenous sediments. Lower-Beryozovskaya subsuite contains an opokamorphic reservoir which demonstrates relationship between fracturing and well deliverability and the nature of pressure buildup curves. The obtained pressure buildup curves have been classified and the reasons for such responses have been analyzed. The paper presents the procedure of well testing scheme selection for Beryozovskaya suite based on well potential productivity.

Key words: *low-permeability reservoirs, silica clay, Beryozovskaya suite, pressure transient test, fracturing*

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**ESTIMATION OF OPTIMUM NUMBER OF HYDRAULIC FRACTURING STAGES IN
HORIZONTAL WELLS DRILLED IN WESTERN PART OF AV1(1-2) FORMATION,
SAMOTLORSKOYE FIELD**

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Abstract. The paper presents rapid analysis of well performance data for different options of horizontal well completion using multistage fracturing based on proppant weight and spacing between fractures, performed through generalized modeling of productivity index (PI).

Key words: *edge zone, low permeability, horizontal wells, multistage fracturing, productivity index*

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STUDY OF THE INFLUENCE OF THERMAL STEAM AND CHEMICAL METHODS ON THE HYDROCARBON COMPOSITION OF BITUMINOUS OIL

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Abstract. The involvement of development of natural bitumen reserves is becoming more relevant for oil-producing companies due to the depletion of hydrocarbon reserves in conventional fields. Along with the thermal methods, the use of combined methods with sequential injection of steam and solvent, increasing the degree of oil recovery, is promising for extra-viscous oil fields. Conducting filtration research on reservoir models makes it possible to apply the results of laboratory experiments and optimize the use of such development technology in real oil fields and reduce risks during pilot works.

This paper presents the results of a comparative analysis of the component composition of bituminous oil, which was extracted from the sand-packed reservoir model using thermal and chemical impact methods.

Gas-liquid chromatography (GLC) is considered one of the main methods for compositional analysis of oil. This method is based on the separation of hydrocarbon mixtures in chromatographic columns under dynamic conditions. The GLC method has high accuracy and separating ability to perform qualitative and quantitative compositional analysis of the test sample.

Filtration research was performed according to the methodology using the PIK-OFP/EP-K-T Geologic unit, which was developed with the Russian state support, on a reservoir model consisting of natural bitumen-saturated core from the Ashalchinskoye field and quartz sand saturated with bituminous oil from the Ashalchinskoye field. The use of quartz sand in physical modeling made it possible to ensure the comparability of experiments and to avoid the influence of geological heterogeneity of core material on the results.

The composition of bituminous oil displaced after the application of steam and solvent was studied on a gas-liquid chromatograph in the range of programmable temperatures of 20-350°C using the method of internal normalization.

The results of chromatographic research of bituminous oil revealed that the combined use of thermal and chemical methods contributes to a more efficient displacement of bituminous oil from the sand packed reservoir model and an increase in the development of heavy hydrocarbon fractions.

Key words: *bituminous oil, hydrocarbon composition, chromatography, reservoir model, oil displacement, steam injection, chemical injection.*

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NEW APPROACH TO DRILLING AND COMPLETION OF WELLS IN MULTIPLE-CONTACT CONTINENTAL-GENESIS RESERVOIRS OF A LARGE FIELD WITHIN KRASNOYARSKS REGION

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Abstract. PJSC Rosneft Oil Company is implementing a series of initiatives related to development of large promising assets of West Siberia, in that number Tagulskoye oil-gas condensate field located within the Krasnoyarsk region. The field exhibits complex geology and reserves structure.

Best global practices in the development of multilayer reservoirs provide for variations of successive extraction of reserves from the bottom up through drilling directional wells. With respect to the field under consideration, a stage-wise drilling approach is applied in an attempt to implement individual development systems based on horizontal wells for each pay zone. Drilling of multilateral wells with two or more horizontal holes has also been widely practiced.

To enable production of high-viscosity (200 cPs) oil, which accounts for as many as 30% of initial in-place reserves, a targeted program for further study of hard-to-recover reserves areas has been developed.

The article describes new unconventional solutions for the development of multilayer fields, characterized by complex and heterogeneous geological structure.

Key words: *field development strategy, multilateral well, discontinuous reservoir of continental genesis, project well stock, development phase, well pad, confident drilling zone.*

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HORIZONTAL AND MULTILATERAL DRILLING TO IMPROVE EFFICIENCY OF OIL PRODUCTION FROM BASHKIRIAN DEPOSITS

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Abstract. Today, reservoirs are produced by horizontal wells in a non-systematic manner. This paper discusses the efficiency of horizontal drilling in the Bashkirian deposits.

The objective is to optimize horizontal well spacing in Bashkirian carbonate reservoirs in Tatarstan. Several well spacing patterns have been proposed. Well patterns have been analyzed and compared with each other to identify the most efficient field development scenario. Two well patterns have been identified as the most efficient among the ten proposed variants.

The results obtained are suggested to be used for improvement and systemization of reservoir development by horizontal wells. Transition from uncoordinated to systematic horizontal drilling can improve field development efficiency and increase oil production.

Key words: *horizontal wells, uncoordinated drilling, systematic well placement, development scenarios, field development efficiency*

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TECHNICAL ASPECTS OF CASING CEMENTING WITH SIMULTANEOUS ROTATION

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Abstract. Good-quality cementing is achieved when drilling mud is replaced completely with cement slurry. Construction of directional wells is often accompanied by presence of bottlenecks at pipe-borehole contact points restricting the flow of drilling mud. The most effective technique to solve this problem is rotation of the casing string during cementing. Numerous bench tests and simulation studies confirmed that casing rotation can improve replacement of drilling mud with cement slurry. However, this is not a commonly used practice. This is primarily due to lack of specialized wellhead equipment and threaded joints load limitation. The paper reviews the development of casing-rotation-while-cementing technology in PJSC TATNEFT. The first casing rotation operations were performed in heavy-oil horizontal wells drilled using slant drilling rigs. Application of a rotating cementing head enabled continuous casing rotation with no need for shutdowns to squeeze the cement plug and significantly improved cementing quality. For large-scale implementation of the casing rotation technique, a versatile rotating cementing head has been manufactured for cementing of 102-168-mm casing strings. Experience has shown that the key barrier for nonstop casing rotation during cementing jobs is torque limitation for buttress thread connections. Another limiting factor is the effect of torque and drag accompanied by the increased hook load, resulting in casing rotation stoppage. Nevertheless, acoustic and gamma-gamma cement-bond logs prove beneficial effect of casing rotation in obtaining a homogeneous cement sheath.

Key words: casing cementing, casing rotation, cementing head, cementing quality, zonal isolation

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RESULTS OF INDUSTRIAL APPLICATION OF WELLHEAD HYDRAULIC JACK

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Abstract. Considering that light-capacity hoists have found wide application in TATNEFT during well interventions and due to growing number of wells equipped with packer and anchor assemblies for artificial lift operations, conventional well intervention tools may fail to facilitate unsetting and retrieval of such equipment. This prompted engineers of TatNIPIneft Institute to develop DUG-40 [1] wellhead hydraulic jack – a cost-effective solution to meet downhole challenges that does not require a workover rig.

Currently available are various wellhead jacks. These primarily have large cross slabs and stand on the ground [2, 3]. Such devices are extremely heavy and require mobile cranes for mounting, particularly in cases of high-set tubing or stuck hanger. Such jacks also require special preparatory arrangements at the wellhead area (construction of a work site, laying support plates). The main unique characteristics of DUG-40 include travel length of as high as 1 meter, upward extension of upside-down cylinder, landing into production casing coupling, and clamping capabilities due to application of two spiders. Jack lifting capacity is 50 tonnes.

The hydraulic jack has simple design; low-set top clamp ensures easy operation of the device. Due to landing into wellhead connector, the jack allows to detach stuck tubing head adapter (tubing hanger) from wellhead adapter flange.

Hydraulic jack design provides for hydraulically forced return of the cylinder to its original position by utilizing the annular space between piston rod and the cylinder.

Pilot tests of the hydraulic jack have been conducted in wells operated by TATNEFT Company. Various well intervention jobs have been conducted to gain the experience: unsetting of packers and anchors, stuck tools, tubing hanger.

The paper describes hydraulic jack design and operation as well as field test results in 14 wells, which confirmed its efficiency.

Key words: *wellhead hydraulic jack, cylinders, wellhead flange, wellhead connector, production string, top clamp, bottom clamp.*

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ANALYSIS OF UNCONVENTIONAL RESERVES PRODUCTION COSTS FOR DEVONIAN TERRIGENOUS RESERVOIRS

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Abstract. The paper presents the results of ROI (return on investment) analysis for the development of terrigenous Devonian reservoirs of the Romashkinskoye oil field. Possible ways of payback are discussed involving more efficient operation of wells drilled into Devonian deposits with varying clay content in a terrigenous reservoir. Calculations show that many injection wells consume electricity inefficiently, since the producing well response is not considered when operating the injectors.

Calculations show that cost of oil production from the terrigenous Devonian reservoirs of the Romashkinskoye field mostly depends on porosity and permeability properties of these reservoirs. This is due to the fact that "target" wells (clay content > 4%) are less attractive in terms of well interventions than "non-target" wells (clay content < 4%).

Key words: *semi-variable costs, special-purpose fund, general fund, waterflood types, production cost, porosity and permeability*

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STUDY OF EROSION WEAR RATES

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Abstract. Erosion of metal in gas production and processing facilities can be caused by sand production, which takes place under certain well operation conditions.

Determination of solids' contribution to the gas facilities performance poses a serious technical challenge, so, studies related to erosion wear are very important. The problem is that as the gas flow velocity increases above the regulated value, the erosion wear increases insignificantly, while the allowed erosion rate is not achieved.

Based on the results of calculations, an optimal operation mode can be determined when the allowable sand content in products is not specified. As the gas flow velocity increases, the erosion rate changes just slightly due to decrease of sand production and change of product parameters. At higher sand content, the erosion rate approximates the allowable level. Increase of gas flow velocity is not recommended in this case to prevent damage of gas lines.

The recommended approach allows updating the technological throughput constraints considering specific characteristics of gas flow lines.

To-date, the majority of gas fields have entered the closing stage of development involving numerous midstream problems related both to gas gathering and gas transportation to end users.

The abrasive wear of gas gathering and processing facilities is one of the main reasons of walls' thinning in gas flow lines and processing facilities, and of shaft seizure in compressors, leading to TBO decrease and affecting the overall economic performance.

Key words: *technological constraints, gas line, erosive wear, corrosion wear, solids, hydraulic calculation.*

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**THE PROPOSALS DEVELOPMENT FOR RECULTIVATION OF THE SLUDGE BARNS
AT THE ENTERPRISE OF OJSC «SURGUTNEFTEGAZ»**

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Abstract. Today, the widely used traditional method of the so-called “reclamation” of oil sludge pits by covering them with sand does not solve the problem of soil contamination because this results in long-term conservation of oil and oil products without air access. Based on ecological-geochemical and plant-sociological studies, a number of measures have been proposed for oil sludge pit reclamation. These involve filling of sludge pits after oil and water have been pumped out with different materials, including sand, peat, and other soils. Application of chemical fertilizers is required for hydrocarbon oxidizing bacteria activity. The final stage of reclamation is recommended to include phytoremediation which means covering the oil sludge pit surface with peat, fertilization and setting of oil-tolerant plants. The recommended plants are a smooth brome, a red fescue, a false wheat, bulbous bluegrass, and a meadow clover. Another method of remediating oil-contaminated soils involves planting of willow cuttings, which significantly reduces cost price of planting and allows achieving the desired results more quickly than in other methods.

Key words: *oil sludge, oil sludge pit, bioremediation, phytoremediation, reclamation of oil-contaminated soil, biological reclamation*

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LEGISLATIVE SUPPORT OF PETROLEUM RESOURCES ASSESSMENT PROCEDURE

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Abstract. The authors investigate legal aspects of a range of problems associated with applicable procedures for assessment of oil and gas resources. Comprehensiveness of regulatory relationship management is evaluated. Regulatory conflicts are identified, existing legislation improvement options are proposed.

Key words: *subsoil use; geological information; subsoil resources; resources assessment*