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OIL AND GAS PROSPECTS OF NEOCOMIAN DEPOSITS OF THE PRE-URAL PART OF SHAIM PETROLEUM BASIN

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Prospects for oil and gas content of Neocomian sandstone layers which are spread in the north-western part of Shaim petroleum basin are considered in the paper. It is exactly the territory where the most favorable paleo-geomorphic conditions for formation of petroleum reservoirs and hydrocarbon are found. The Neocomian sequence is the main prospective target of the Western Siberia the deposits of which are characterized by considerable concentration of initial potential resources and identified hydrocarbon resources. The largest and prolific oil accumulations, being nowadays the main target of oil production, are confined to this sequence's sediments. Prospects for oil and gas content of Urai region are associated not only with the new oilfields discovery in the new areas of Middle and Upper Jurassic deposits, traditional for Shaim petroleum basin, but also with prospecting for the objects in the region's new geological interval, namely, Neocomian deposits. Paleo-geomorphic and dynamic analysis and the basin modeling served the basis for predicting development of hydrocarbon traps in sediments of harsoimskaya suite.

Key words: neocomian deposits; harsoimskaya suite; paleo-geomorphic analysis; dynamic analysis; paleo-tectonic reconstruction; basin model.

PIPE GRABS USED FOR PIPES REMOVAL IN COMPLICATED CONDITIONS OF WELLS OPERATION AND OVERHAUL

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In case of wells' overhaul, liquidation of failures and complications which can occur during wells operation and overhaul, are considered the most difficult and time-consuming types of work. The most frequent kinds of failures are the following: pump-compressor tubing (PCT) sticking by a sand plug during well operation or washing, sticking of PCT together with a down-hole pump by a sand plug, flight of PCT or PCT together with a

down-hole pump and abandonment of an electric submersible pump with a cable or without it in a well.

Catching tools, namely, pipe grabs, which are used nowadays for broken pipes removal out of wells, are considered in the paper. Some pipe grab designs, to be used for catching and sticking of the broken pipes out of vertical, directional and horizontal wells in complicated conditions, are proposed. Constructions of pipe grabs, intended for capture and catching of the broken pipes in the complicated conditions from vertical, slanted direction wells and horizontal wells are offered. The results of tests, which testify increase of reliability of the torn-off pipes removal out of purposely deviated wells, equipped packers, are presented.

Key words: catching tools; pipe grab; body; die-stock; die; centralizer; nose; teeth; pyramid; broken pipe; complicated conditions; well overhaul.

RESEARCH OF TEETH SLIPPING OF ROLLING CUTTER DRILLING BITS

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The research of toothed equipment slipping along the bottom hole during operation of rolling cutter drill bits is performed. Two main types of this process, namely, slipping and partial slowdown are identified. Mathematical modeling of rolling cutter rotation served the basis for defining of teeth tops motion path of a drilling bit during its operation. The areas of bottom hole damage by the teeth of cutting structures of rolling cutter drill bits during slippage and partial slowdown are determined by means of analytical calculations. Thus, the research of the process of toothed cutting structures slipping along the bottom hole during operation of rolling cutter drill bits, carried out in the present paper, allows making a conclusion that from the point of view of the bottom hole damage the process of partial slowdown of cutting structures of rolling cutter drill bits is much more efficient than the process slipping.

Key words: rolling cutter drill bit; cutting structures geometry; slip; slowdown.

DETERMINATION OF THE REQUIRED EFFORT TO PROVIDE THE NECESSARY VOLTAGE FOR A PLUNGER-SEALS COUPLE OF OILFIELD PUMPS

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The article solves the problem of determining the required value of the effort to provide the necessary voltage of a plunger-seals couple of oilfield pumps. Years of experience in oilfield equipment operation while wells underground overhauling witnesses the fact that insurance of the reliability and operational durability of the pumping units is largely determined by the quality and performance characteristics of pump parts and fric-

tion units of the pumps hydraulic system. Major causes of pump parts failures are plungers and valves wear-out and packing seals breakdown.

Key words: plunger; packing seals; sealing; contact voltage; radial pressure; axial force.

REVERSE VIBRATOR USED AT OIL FIELDS

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Various vibration technologies are used for enhancement of oil recovery from formations, washing of near bottomhole area and downhole equipment. Vibration technologies providing increase of wells productivity are used thanks to their cost-effectiveness.

Different types of vibrators and devices such as hydro-mechanical, hydraulic, electro-hydraulic, ultrasonic, are used to provide vibration effect. The disadvantage of the existing vibrators and devices is fluid pulsation only in one direction. Performance of a great number of works requires the following operational mode of a vibrator: provision of fluid pulsation while its pumping into and out of wells.

The paper substantiates the necessity of development, construction diagram, the scheme and dynamics of a reversible vibrator operation. The research results of the mathematical model of the reverse vibrator lever mechanism are submitted. The basic dimensions of the vibrator experimental prototype are presented.

Key words: reverse vibrator; vibration technology; fluid pulsation; crank; valve; kinetic energy; Lagrange equation of the second kind; moment of the mechanism inertia; the generalized force of the mechanical system.

PURIFICATION OF ASSOCIATED PETROLEUM GAS FROM HYDROGEN SULFIDE BY GREENMAX 850 CHEMICAL ADSORBENT

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Results of pilot testing of Greenmax 850 new chemical adsorbent, carried out at the enterprises of oil and gas complex while purifying associated petroleum gas from hydrogen sulfide, are presented in the paper. Some possible mechanism of hydrogen sulfide reaction with chemical adsorbent components is discussed. It is shown that the reaction resulted in molecular sulfur formation. Presence of sulfur is confirmed by Raman scattering spectrum data. The data on sulfur content of the chemical adsorbent, confirmed by elemental analysis of control samples of the spent reagent, are submitted. The average sulfur content

of the spent chemical adsorbent makes 0,3 kg of sulfur per one kg of chemical adsorbent that does not exceed 60 % of the theoretically possible one. Maximum sulfur content spent of the spent chemical adsorbent reaches 90 % of the theoretical one. The plant working capacity in actual operational conditions of the object is proved. It is shown that in addition to hydrogen sulfide purification from associated petroleum gas (APG) Greenmax 850 chemical adsorbent provides cleaning of APG from mercaptan sulfur and simultaneous additional drying of gas. The spent chemical adsorbent is of the 4th class of danger.

Key words: purification of associated petroleum gas from hydrogen sulfide; manganese dioxide; gas drying.

STUDYING OF OPERATIONAL EFFICIENCY OF VALVE ASSEMBLIES OF DOWNHOLE SUCKER-ROD PUMPING UNITS

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The mathematical models of valves used for operation of downhole sucker-rod pumps are developed. Hydraulic characteristics of valves of different design are built. The characteristics make it possible to choose the design of valve assemblies for specific operating conditions. The test facility for studying valve assemblies of sucker rod pumps is developed.

Key words: sucker-rod pump; valve assembly; valve mathematical model; hydraulic resistance.

3D MACHINING OUT-OF-FURNACE THERMAL TREATMENT WHILE PERFORMING MOUNTING AT CONSTRUCTION OBJECTS OF PETROCHEMICAL COMPLEX. THERMAL TREATMENT OF T-2001 VACUUM TOWER OF ELOU-ABT-12 UNIT

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Mounting of "T-2001" vacuum tower of 41500 mm high, 9600 mm of diameter and maximum wall thickness of 48 mm at the site of "RN-Tuapse Refinery, Ltd." enterprise required thermal treatment of its body in order to remove residual welding stresses. Due to the vacuum tower's impressive size furnace heating products proved unworkable and the local thermal treatment appeared unprofitable, labor-intensive and didn't ensure complete removal of the stresses. Some method of out-of-furnace, 3D machining thermal treatment, unique for the object of such size, was proposed. The technology and equipment deve-

loped by the specialists of "VNIPTchimnefteapparatura" allowed simultaneous heating of the facility's whole body in accordance with high tempering mode thus providing even temperature distribution, good control over the process and, consequently, high quality of thermal treatment.

Key words: out-of-furnace, 3D machining thermal treatment; petrochemical complex; vacuum tower; residual welding stresses; local thermal treatment; weld; high tempering; heating source; temperature control; furnace heating; heat carrying agent.

PROBLEMS OF RESOURCE SAVING WHILE CHOOSING THE LENGTH AND PLACEMENT OF HORIZONTAL WELLS

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The main factors effecting horizontal wells flow-rate are analyzed. Some examples of horizontal wells usage in conditions of terrigenous and carbonaceous reservoirs are considered.

Key words: well; flow-rate; formation thickness; horizontal wellbore.

DEVELOPMENT OF HIGH-VISCOUS OIL DEPOSITS BY APPLYING THE METHOD OF STEAM-GRAVITATIONAL AND ELECTRIC-THERMAL STIMULATION OF A FORMATION

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The electric heater is proposed to improve the effect of a formation thermal-steam stimulation. A tail pipe, located in a formation productive zone is used as an electric heater. Electric current runs through the above-said tail pipe. This allows using horizontal wells for extracting high viscous oil out of a formation. Some part of a deposit is covered by wide-spaced producing wells with two horizontally branched wellbores and horizontal wells. The valves are placed on producing wells' side-tracks, which allow implementing cyclic interval recovery of a productive formation. The suggested technology of cyclic interval recovery of productive formations takes into account the dynamics of non-simultaneous water-flooding process of a collector's zones with different irregular permeability. It allows involving the formation's low-permeable zones into the filtration process, i.e. embracing all mobile oil reserves by water-flooding.

Key words: high-viscous oil deposits; cyclic steam treatment of wells; horizontal well; electrical heater.

SOLIDS SETTLEMENT ON THE INNER SURFACE OF HORIZONTAL PIPELINES

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The problems of solids settlement from oil volume in horizontal canals and pipelines are considered. Conditions of turbulent solids settlement are analyzed and some mathematical model of the process is built. Comparison of the settlement design speeds in horizontal pipelines with the existing experimental data is conducted.

Key words: solids settlement; gravitational settlement; horizontal pipe; turbulent settlement speed; isotopic turbulent flow.

SEWAGE TREATMENT UNIT AT FILLING STATIONS WITH ADDITIONAL PUMPING-OUT OF OIL PRODUCTS INTO SOME SEPARATE TANK

The RF patent of utility model

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The useful model refers to the devices of waste water treatment at filling stations. The unit allows effective waste water treatment at filling stations from oil products, mechanical impurities and suspended materials as well as collecting oil products in some separate tank. The useful model involves two filter sumps, distribution pipelines with gate valves, pump units, coarse-mesh and fine filters, tanks for waste water, clean water, slime and oil products.

Key words: filter; tank; sewage unit; pipeline; gate valve; waste and clean water; mechanical impurities; oil products; pump; intake pipe.

DETERMINATION OF MECHANICAL INDICATORS OF PLASTIC DETAILS OF OILFIELD EQUIPMENT

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The analysis of manufacturing of plastic parts to be used in oilfield equipment is carried out. Regularity of dependence of plastic parts shrinkage on their manufacture modes is proved.

Changes of ready-made parts quality depending on the casting pressure are defined as well as dependence of change of shrinkage, density, roughness, hardness and breaking stress while stretching on casting modes are determined.

Key words: oilfield equipment; technological parameters; manufacturing process; optimum pressure; press-mould.

MODELING OF PROCESSES OF ORGANIZATIONAL-MANAGERIAL INSTRUMENTS FORMATION RELATING TO REALIZATION OF INVESTMENT-CONSTRUCTION PROJECTS

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The article discusses problems relating to further development of management methodology of implementation of investment-construction programs of large industrial companies.

One of the main conditions of the companies' stable economic growth and guarantee of their productive assets reproduction appears activity directed to intensification of investment operations, formation of investment provision to ensure production processes, favoring conditions of effective attraction and distribution of real investments aimed at stable development.

In today's market environment implementation of some investment-construction program takes place in conditions of constant dynamism of both external and internal environment, which necessitates making management decisions under uncertainty.

Formation of adequate organizational-managerial tools for investment-construction programs implementation largely depends on the thorough consideration of information links between the project administration and some separate and independent executives. The effectiveness, in this case, largely depends on management-information tools applied for adoption and enforcement of managerial decisions, which serves the managerial basis for investment programs implementation.

To improve efficiency of construction-investment processes management, reduce total costs and expenses while implementing programs and projects, particular attention is paid to formation of effective principles, organizational and economic conditions, ensuring efficient management of investment and construction processes in the overall business pattern of a production company.

Key words: investment-construction project; organizational-managerial tools; production company; simulation model; investment resources.