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The paper presents the method of evaluation of water and gas (WAG) effect potential for complex low-permeable reservoirs that was tested at the fields of Western Siberia. The testing resulted in proving of good perspectives of the technology application in such reservoirs. The integrated approach to WAG evaluation process as well as detailed modeling of gas-water effect in miscible and immiscible displacement modes allowed more precise WAG efficiency calculation thus avoiding common underestimation of the technology applied.

**Key words:** low-permeable reservoirs; hard-to-recover reserves; water-gas effect; miscible displacement; uncertainty analysis.

The paper studies the effect of water-flooding source removal from multilateral horizontal wells at different values of the angle between the horizontal wellbores on its productivity for oils with different viscosities. Priority options of water-flooding source placement with regard to a multilateral horizontal producing well that provide significant increase of oil recovery factor are identified.

**Key words:** multilateral well; angle between wellbores; distance up to water-flooding source; increase of oil recovery factor.

The analysis of the results of long-term application of the method applied for oil formations water-flooding at large fields of Tatarstan is presented. Aktash area of Novo-Elkhovsky oilfield of JSC "Tatneft" is taken as an example for proving the fact that the technology application has significant aftereffects that were identified in the course of long-term researches. The influence of man-caused changes in oil deposits operating conditions on generation of organic sediments in a productive formation, near-bottomhole area of a formation or a well is studied. The mechanism and factors of formation of asphalt-resin-paraffin
sedi ments and mudding of the bottomhole area of a formation by products of the formation fluid removal are considered, recommendations on the use of various purification methods are given.

Key words: oil; development; water-flooding; mudding; oil recovery; formation; well; flow rate; productivity; permeability; reservoir.

UDC 622.276. II m. M

THE METHOD OF PRESSURE IMPULSES CREATION FROM THE WELLHEAD IN THE BOTTOMHOLE AREA OF A FORMATION (p. 27)
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Short-term creation of pressure at the wellhead, providing some resonant motion of the compacted mass of a borehole fluid column, leads to compression of sub-layers, bringing them into motion, thus increasing the moving mass, which, when reaching the sump, creates a pressure pulse the amplitude of which exceeds the wellhead one. Advantages of hydraulic shock effect on the near bottomhole area of a formation as compared with constant pressure, which is used for performing a formation hydraulic fracturing, are shown. The paper presents results of researches, carried out by direct measurement of bottomhole pressure, that witness the wave nature of pressure changes.

Key words: near bottomhole area; hydraulic shock impulse of pressure; perforation channels; pump unit; liquid injection; hydraulic fracturing of a formation.

UDC 622.276.6

APPLICATION OF WAVE MONITORING TECHNOLOGY WHEN PERFORMING A FORMATION HYDRAULIC FRACTURING (p. 29)
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The article considers some problems relating to effectiveness of fields’ development with hardly-recoverable reserves or depleted formations, being in the final stages of operation. The necessity of applying complex technology of a formation volumetric wave stimulation and a formation hydraulic fracturing in order to increase product recovery out of a formation is substantiated. The results of field application of the technology are presented.

Key words: geological and technical measures; a formation hydraulic fracturing; volumetric wave stimulation; production well; injection well.

UDC 622.276.5

STUDYING OF THERMOBARIC FACTORS EFFECT ON PROPERTIES OF TWO-PHASE FOAM AND MICRO-FOAM SOLUTION (p. 33)
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The paper proposes some new method of oilfield development based on two-phase foam. To make the two-phase foam possess the claimed properties a series of laboratory tests was carried out, the results of which served the basis for developing of some hydrocarbon-based system (RSUO), namely, micro-foam solution. Pressure effect on the change of volume and diameter of the globule of two-phase foam and micro-foam solution was studied.

Key words: two-phase foam; micro-foam solution; water-soluble surfactant; sulfanol.

UDC 622.276.53.054.4

REGULATION OF VIBRATIONS OF ROD STRING OF SUBMERSIBLE SUCKER-ROD PUMPS IN CASE OF A STRIKE (p. 35)
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The paper considers behavior of a rod string in case of a strike and character of dynamic pressure change in rod strings. Equation of a homogeneous rod vibration was used for deeper studying of rod string vibration in case of a strike.

Key words: rod strings; a homogeneous rod vibrations; dynamic pressure; dynamic load; rod strings weight.

UDC 622.276

REGULATION OF HYDRAULIC CHARACTERISTICS OF WATER SYSTEMS BY ALTERNATING MAGNETIC FIELD (p. 39)
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The paper proposes some new method of oilfield development based on two-phase foam. To make the two-phase foam possess the claimed properties a series of laboratory tests was carried out, the results of which served the basis for developing of some hydrocarbon-based system (RSUO), namely, micro-foam solution. Pressure effect on the change of volume and diameter of the globule of two-phase foam and micro-foam solution was studied.

Key words: two-phase foam; micro-foam solution; water-soluble surfactant; sulfanol.
The paper considers effect of some alternating magnetic field on the flow of gas-liquid systems moving in the pipe. The flow-rate characteristics of tubing before and after treatment by the alternating magnetic field were compared in the course of experimental studies. It is proved that tubing flow capacity increases while moving of the gas-liquid stream with a surfactant after treatment by alternating magnetic field. While moving of gas-liquid flow through the alternating magnetic field there appears the flow structure possessing the least hydraulic resistance that makes it possible to adjust the parameters of gas-liquid systems. The results obtained allowed demonstrating the possibility of using alternating magnetic fields in oil and gas production process.

Key words: oil and gas production; gas-liquid system; alternating magnetic field; treatment; tension; flow capacity; flow-rate; tubing.

UDC 532.329

STUDY OF MOTION OF GAS DISCRETE ENTITIES IN CASE OF ONE-LINE TRANSPORTATION OF GAS-LIQUID MIXTURE (p. 42)

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Pipeline transportation of gas-liquid mixtures in the system of gathering and transportation of oil wells products is widely used in oil and gas industry. Complexity and variety of phenomena, accompanying gas-liquid flows via pipelines, appear the reason for the fact that up to now their studying and development of formulas, ensuring hydraulic calculations, do not go beyond the frames of pure empiricism. The paper proves the fact that the vector of fluid pressure forces on the surface of a body, immersed into it in dynamic conditions, consists of the vertical and horizontal components. Previously unknown horizontal component of the main vector of fluid pressure forces on the surface of gas accumulation is revealed. Theoretical formulas for determination of the volumetric (true) gas content are obtained.

Key words: movement of gas-liquid mixtures in horizontal and inclined pipelines; volumetric gas content; volumetric weight of mixture; pressure gradient along the flow; relative velocity of gaseous phase of gas-liquid mixture.

UDC 622.691.72

CHOOSING OF THE NEW COMPOSITIONAL INHIBITOR PROVIDING GAS PREPARATION FOR TRANSPORTATION (p. 47)

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While preparing gas for transportation there appears necessity of development of some new compositional inhibitor to prevent formation of hydrates. The new composition of the complex action inhibitor simultaneously prevents formation of hydrates, corrosion and salts sedimentation in the system of field gas preparation for transportation. Application of the new composition will allow decreasing specific consumption of methanol, widening the base of nanocomposition use, chemical reagents in oil and a gas industry and enhancing ecological purity of the region. The experimental data analysis witnesses the fact that mixing of the new inhibitor components causes some synergistic effect thanks to which high level of natural gas purification and dehydration from moisture and acid components is reached when applying the developed composition of the inhibitor. High quality and better indicators of synergistic properties of the developed inhibitors open some new trend of their use in oil and gas industry on a large scale.

Key words: formation of hydrates; inhibitor; gas; composition; fraction.

UDC 622.691.1

CALCULATION-PRACTICAL METHOD OF REGULATING EFFICIENCY OF THE TECHNOLOGICAL PROCESS USED FOR GATHERING, PROCESSING AND TRANSPORTATION OF GAS IN FIELD CONDITIONS (p. 50)

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The calculation-practical method, developed for the first time, will allow efficient regulation of technological parameters when operating the system of "gathering, processing and transportation of gas" in field conditions without disturbing operational mode of wells.

Key words: oilfield; well; natural gas; associated oil gas; thermal-baric condition; system pressure; system temperature; relative density; relative velocity; pseudo-critical pressure; pseudo-critical temperature; reduced pressure; reduced temperature; separator; knee; fittings; gas pipeline.