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**POSSIBILITIES FOR BOOSTING THE PERFORMANCE OF CYCLIC
WATERFLOODING OF PRODUCTIVE RESERVOIRS AT LATE
STAGES OF THEIR DEVELOPMENT**

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Abstract. The paper analyses various possibilities for enhancing the performance of cyclic waterflooding in terrigenous reservoirs. It has been shown that sustainability of beneficial technological effects deteriorates gradually due to irreversible reservoir pressure depletion resulting from inadequate voidage replacement ratios. A solution to controlling the closure of fluid-conductive channels in the productive reservoir is proposed. This implies application of cross-well seismic tomography followed by relaxation processes induced in situ using dilatation-wave technique to create secondary fluid-conductive channels in the productive reservoir. It is recommended that local wells be selected within flexural folds and periclinal. Field tests of the proposed waterflood optimization technology at the Romashkinskoye oil field have proven its efficiency.

Key words: *cyclic waterflooding, stress state, relaxation, vibratory and wave treatment, flexural folds and periclinal, seismic tomography, fluid-conductive channels*

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CALCULATION ALGORITHM OF THERMAL INTERACTION OF OIL WELL WITH PERENNIALY FROZEN ROCKS

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Abstract. The article discusses the calculation methods of thermo-physical interaction processes in the system "permafrost-well" in view of the physical and geological factors of oil wells. To explore these questions, calculations were made to determine the effect of the heat transfer coefficient on the value of the radius of the thawing of rocks around the well at a fixed temperature heat.

The developed model allows calculations for computational domain consisting of various components. Numerical simulation results allow us to make long-term forecasts by thawing perennially frozen rocks and make recommendations by well insulation.

Key words: *finite - element difference, perennially frozen rocks, heat transfer, phase transition, non-stationary Stefan problem, enthalpy method.*

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**DETERMINATION OF THE BEST TIME FOR APPLICATION OF
SELECTED EOR TECHNIQUE**

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Abstract. This paper reviews a new approach to oil production staging which enables selecting the best EOR technique for a certain stage of field development based on the average annual production rate curve. This new approach involves continuous monitoring of well productivity history and benchmarking against a calculated reference curve. Plotting of well productivity curves facilitates timely implementation of the selected EOR method.

Key words: *water drive, production staging, initial development stage, final development stage, reference curve, drainage area, external reservoir boundary, net pay, initial recoverable reserves, microbial stimulation, wellbore damage.*

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MARKER TECHNOLOGIES IN OIL PRODUCTION

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Abstract. Marker technologies as applied to oil production imply monitoring reservoir fluid flow within the productive reservoir as well as the flow of fluids in wells and pipelines by means of controlled changes in the properties of these fluids. For sulfur-containing oil fields, hydrogen sulfide is recommended for use as the indicator. The balance of hydrogen sulfide is considered upstream and downstream of the preliminary water discharge unit.

Buildup of asphaltene, resin and paraffin deposits in downhole equipment and oil-gathering pipelines impedes the production performance considerably and requires prompt response with application of well-established and emerging technologies. The techniques for quantitative diagnostics of such deposits, presented in this paper, are based on well-known heat engineering and hydraulic principles, as well as recent advances in subsurface telemetry.

Key words: *hydrogen sulfide, well, water-free oil, electrical submersible pump, frequency controller, tubing string, temperature measurements, pressure, fluid flow rate, paraffin deposits.*

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GEOSTEERING METHOD AIDS DRILLING INTO BYPASSED ZONES IN THE INTERWELL SPACE

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Abstract. The paper reviews the geosteering method for directing a drill string provided with MWD system based on electromagnetic communication channel to drill into bypassed zones in the interwell space. The exact location of bypassed oil is determined by a deep resistivity probe. While targeting the bottom hole of a well to the bypassed zone, electromagnetic signals generated by MWD telemetry system are recorded using a specialized surface facility which further generates output control signals aimed at adjusting borehole trajectory to reach bypassed oil in the interwell space.

Key words: *geosteering, MWD telemetry system, well trajectory, bypassed oil, interwell space, inclination and azimuth.*

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THE STUDY OF BUFFER LIQUIDS FOR IMPROVING THE QUALITY OF WELL CASING

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Annotation. One of the main ways to achieve a reliable zonal isolation in an oil well is to prepare the well for adoption of the cement slurry. For this purpose the buffer liquid is used. Its main task is to completely displace the drilling fluid from the annulus and the surface treatment of the casing and the borehole wall for better bonding with the cement. Buffer and washing liquids are used to increase the degree of displacement of drilling fluid from the annulus, to bring the casing into the wellbore and the water-wettable condition (without hydrocarbons) and the separation of drilling fluid from the cement slurry.

The article provides results of laboratory tests to determine the laundry ability of buffer fluid with respect to various drilling fluids in order to compare their effectiveness.

The research was carried out by the method of evaluating the effectiveness of buffer liquid (Cementing Engineering Manual 2.B.5. Surfactant Selection (Dec.2002) Schlumberger) in a pilot plant (OFITE MODEL 900) under conditions that simulate the well.

Key words: wells, cement slurries, spacer fluid, the annulus, the mud, the ability to launder.

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**INCREASE OF THE IMPACT RESISTANCE OF A CEMENT STONE
TO DYNAMIC PRESSURE BY FIBER REINFORCEMENT OF
PLUGGING MATERIALS**

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Abstract. Cement stone, that provides tight lining of the well is the weakest part and can easily collapse under the enforcements, such as major dynamic loads, high pressure drops etc. And the biggest pressure for a cement stone is the sheath fracturing and perforations. One of the main reasons for the destruction of cement stone is bad distortion and low impact resistance.

The article discusses the use of fiber reinforcement as a way to improve the impact resistance of a cement stone to dynamic loads and various sort of pressure.

The results show that the use of cement slurries combined with fiber materials highly increases the impact resistance of a cement stone.

Keywords: *cement stone, the lining of the borehole, dynamic loads, demolition, reinforcement.*

**SELECTION OF INHIBITORS WITH CONTROLLED PROPERTIES
TO PREVENT PARAFFIN SEDIMENTATION WHILE
TRANSPORTATION OF DIFFERENT-VISCOSITY CRUDE OILS**

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Abstract. Interaction between paraffin inhibitors and demulsifiers and pour point depressants was studied using oil samples from Kolvinskoe, Inzyreiskoye, and Sredne-Kharyaginskoye fields and mixtures thereof in different mass ratios. Laboratory testing was conducted under test conditions simulating real field treatment facilities. DIN-2D was used as a demulsification agent with a concentration of 46 grams per ton. A “cold rode” method was used to assess the effect of demulsifiers on paraffin inhibitors performance. It was found that DIN-2D and SNPH-4460 demulsifiers improve the efficiency of paraffin inhibitors 2-4-fold. These results were obtained for wellstream with max watercut of 10%. The effect of pour point depressants on dehydrated oil was also evaluated. The demulsifier effect on pour point temperature is insignificant, as well as interaction between demulsifiers and pour point depressants.

Key words: *high-viscosity oil, asphalt, resin, and paraffin deposits, water-oil emulsions, rheological characteristics of oil, demulsifies, pour point depressant, paraffin inhibitors, flow curves*

УДК 213.3- 123

**MODERN AND CONDITION OF OIL PRODUCTION AND REFINING
IN THE REPUBLIC OF YEMEN**

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Abstract: The paper discusses the issues of oil reserves and oil production in the Republic of Yemen, and the place of oil processing industry in the national economics, also, in comparison with neighboring states.

Key words: *Key words: oil field, oil production, Yemen refineries, natural gas, oil reserves.*

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HISTORY OF OIL-PRODUCING INDUSTRY TAXATION SYSTEM

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Abstract. Long-term development of oil fields has changed the original structure of recoverable hydrocarbon reserves, resulting in change of oil production taxation system.

Key words. *Oil production, legislation, mineral resources production tax, decreasing coefficient.*

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CONCEPT OF OIL-AND-GAS GENESIS FROM PRIMARY MATTERS

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Abstract. The paper expounds upon the concept of oil-and-gas origin which differs significantly from currently existing biogenic, abiogenic and combination theories of petroleum generation. It has been shown that oil and gas are the result of synthesis of primary matters spectrum in certain earth curvature zones. The proposed concept relying on new scientific framework enables to eliminate discrepancies between current observations and studies related to geology and development of oil and gas fields.

Key words: *oil-and-gas genesis, compensation of reserves, concepts, primary matters, nonuniformities of space, dimensionality*