

УДК 622.276.1/.4"712.8"

**STRATEGY FOR EXAMINATION, EVALUATION AND
DEVELOPMENT OF MATURE OIL FIELD RESOURCES BASED ON
EFFICIENT OPERATION OF OLD PRODUCTION TARGETS**

Yu.A. Volkov

ООО CSMRneft

E-mail: yua@csmr.ru

Abstract. The paper presents the strategy for examination, evaluation and development of hydrocarbon resources based on establishment and meticulous implementation of principles of consistent accumulation of knowledge on analyzed production targets and processes that take place therein.

Key words: *hydrocarbon reserves and resources; mature and depleted oil fields, lithological and genetic typing, and facies analysis of sedimentary rocks; structural mapping and reconstruction of palaeotopography; mapping impermeable barriers in the interwell space; forecasting location of tilted oil-water contact; quantitative criteria of reservoir understanding; geological and petrophysical model; reservoir simulation model; residual oil reserves, substantiation of new drilling locations, modernization of oil industry management*

УДК 622.276.5.003

**EFFECT OF TAX LEGISLATION ON OIL PRODUCTION
EFFICENCY**

A.F. Yartiev

TatNIPIneft Institute

E-mail: yartiev@tatnipi.ru

Abstract. Account for subsurface interests by the state tax policy is the basis for future innovation development of the fuel-and-power sector.

Key words. *Oil production, legislation, mineral resources production tax, economic benefits, NPV.*

УДК 550.837

**ELECTRICAL PROSPECTING AS PART OF ENVIRONMENTAL AND
GROUNDWATER SURVEYS IN TATARSTAN OIL FIELDS**

¹P.N. Kubarev, ¹G.I. Petrova, ²M.Ya. Borovsky, ²S.V. Shakuro, ³M.V. Petrova

¹TatNIPIneft, ²ООО Geophizservis, ³Kazan Federal University

E-mail: vlrk@tatnipi.ru

Abstract. This paper discusses the potential and the effect of electrical prospecting in identifying sources of fresh groundwater contamination in Tatarstan oil fields as part of comprehensive environmental and groundwater surveys with the view of working out the guidelines for improving state of the hydrosphere.

Key words: *electrical prospecting, salinization source, vertical electrical sounding, natural-source method, symmetrical electrical profiling, comprehensive environmental and groundwater surveys.*

УДК 622.276.1/.4.038.001.57

**SELECTION OF OPTIMAL DEVELOPMENT SCENARIO FOR A
MULTI-LAYERED HETEROGENEOUS OIL RESERVOIR BASED ON
COMPUTER-AIDED ENGINEERING**

V.N. Petrov, D.T. Kiyamova, I.N. Khakimzyanov

TatNIPIneft Institute

E-mail: petrov@tatnipi.ru

Abstract: Large-scale application of horizontal drilling while bringing into production multi-layered oil fields and further development of mature fields requires scientific substantiation and searching for optimal conditions for construction and operation of development systems with horizontal wells. Consequently, continuing search for optimal placement of horizontal wells aimed at improving oil reserves depletion becomes urgent.

Computer models considered the following three scenarios: 1) nine-spot waterflood pattern involving water injection into a central vertical well, all wells being equipped with dual completion systems for simultaneous operation of all three layers; 2) injection of water into a directional well and simultaneous production through directional wells; 3) horizontal wells producing from each layer individually using dual completion system for production and injection of water into horizontal wells provided with dual completion systems for injection.

According to the results, simultaneous operation of several layers of a multi-layered target is inefficient due to poor reservoir sweep which results in leaving undrained reserves in unswept zones.

Key words: *field, undrained reserves, well, water cut, pressure, equipment, dual completion system for injection, dual completion system for production, differentiation of injection pressure.*

УДК 691.33

**DEVELOPMENT OF NANO-MODIFIED CEMENT FOR WELL
PLUGGING**

¹I.K. Kiyamov, ¹R.Kh. Mingazov, ¹A.F. Muzafarov, ²L.I. Kiyamova

¹Almetyevsk State Oil Institute

²Bauman Moscow State Technical University

E-mail: Kiyamov.Ilgam@mail.ru

Abstract. This paper presents the effect of carbon nanotubes on microstructure of cement sheath, as well as on physical and mechanical properties of cement slurry in the process of well cementing. It has been revealed that with modification of cement paste with carbon nanotubes, a more finely crystalline structure is observed, which is responsible for the increase in compressive and bending strengths of modified cement.

Keywords: *cement; cement sheath; carbon nanotubes; modification; well.*

УДК 622. 276. 66

A DOWNHOLE DEVICE FOR IMPLOSIVE STIMULATION OF INJECTION WELLS WITHOUT LONG SHUTDOWN PERIODS

L.Z. Arslanova, A.Yu. Gutorov

Branch of Ufa State Oil Technical University, Oktyabrsky

E-mail: arslanovalilia@mail.ru

Abstract. This paper discusses the effect impact of formation damage in injection wells on viability of enhanced oil recovery methods which involve injection of water with varying content of chemical or bioactive substances added to improve sweep efficiency and displacement efficiency. Water containing various additives is suggested to be injected simultaneously with implosive stimulation of injection wells without long shutdown periods and with continuous water intake control using a downhole repeated implosion device.

Key words: *near-wellbore area, formation damage, water intake capacity, damage removal, repeated implosion device*

УДК 665.61.033

**CHARACTERISTICS OF LIQUID PHASES FORMED AS A RESULT
OF INTERACTION BETWEEN LOW-BOILING NONSATURATED
SOLVENT AND HEAVY OIL**

M.R. Yakubov, S.G. Yakubova, G.R. Abilova, D.V. Milordov, D.N. Borisov

Arbuzov Institute of Organic and Physical Chemistry

Kazan Research Center of the Russian Academy of Sciences

E-mail: yakubov@iopc.ru

Abstract. Currently in Canada are underway two pilot projects, N-Solv and CSP (Cyclic Solvent Process), aiming to assess practicability of hydrocarbon solvent for heavy oil production. In this connection, realistic models of heavy oil displacement using hydrocarbon solvents are in demand. In case light alkane hydrocarbons are used as solvents, data about how much asphaltenes bridge across the face of formation are needed.

To determine destabilizing effect of light alkanes, two heavy oil samples from the Ashalchinskoye and Mordovo-Karmalskoye fields were used. In the zone of initial interaction between heavy oil and solvent are likely high local alkane/oil ratios resulting in undesirable colloidal destabilization leading to asphaltenes deposition on the formation face. It was found that at *n*-pentane/heavy oil ratios of 6:1, 5:1, 4:1, and 3:1, heavy oil is segregated into a mobile light phase (70-80 %) and a heavy low-mobile phase (20-30 %). Effect of basic factors affecting colloidal stability of heavy oil upon interaction with alkanes was shown: the heavy phase is characterized by decreased content of aromatics and resins relative to the asphaltenes, while the heavy phase's asphaltenes are characterized by increased content of aromatic and decreased content of unsaturated hydrocarbons. To control colloidal destabilization in heavy oil displacement processes using low-boiling alkanes, the solvent system must include stabilizing agents, which show dissolving or peptizing properties relative to the asphaltenes.

Key words: *heavy oil, natural bitumen, hydrocarbon solvent, asphaltenes.*

УДК 622.276.6:576.8

**PROSPECTS FOR MICROBIAL ENHANCED OIL RECOVERY
METHODS IN UNCONVENTIONAL RESERVES DEVELOPMENT**

L.Z. Arslanova

Branch of Ufa State Oil Technical University

E-mail: arslanovalilia@mail.ru

Abstract. This paper discusses mechanisms of unconventional reserves generation and analyzes the efficiency of present-day methods of their production. Microbial injection has proven to be more beneficial in development of unconventional reserves compared to other EOR technologies.

Key words: *unconventional reserves, natural and man-induced factors, microbial enhanced oil recovery methods, rheology*

УДК 661.185.1.004.14:622.276

**AQUEOUS SOLUTIONS OF ZWITTERIONIC SURFACTANTS
AS A REAGENTS FOR OIL DISPLACEMENT**

A.A.M. Al-muntaser, R.R. Sharipov, R.R. Mingasov, N.Y. Bashkirtseva

Kazan National Research Technological University

E-mail: aalmuntaser@mail.ru

Abstract. The paper presents the research data on viability of applying aqueous solutions of zwitterionic surfactants as oil displacement agents. Surface-active properties and flow characteristics, adsorption and oil displacement capacity have been investigated using sand-pack models. According to research results, zwitterionic surfactants exhibit good salt tolerance ability, form viscoelastic aqueous solutions, and have high surface activity.

Key words: *enhanced oil recovery, zwitterionic surfactants, surface tension, oil displacement, dynamic viscosity, adsorption.*

УДК 005.95

**USING SLIDE MASTER 1.18 ON-LINE SIMULATOR FOR HANDS-ON
TRAINING IN OIL AND GAS WELL DRILLING USING LWD
SYSTEMS**

R.A. Ismakov, D.V. Rakhmatullin, I.D. Mukhametgaliev

Ufa State Oil Technical University

E-mail: ILmir8787@mail.ru

Abstract. The paper describes dedicated software to assess proficiency of applicants for positions in drilling enterprises and companies providing services related to oil and gas wells drilling using LWD systems. Matters related to training in principles and procedures of directional drilling in educational institutions are addressed. Special focus is given to integration of the software into the directional drilling technology: requirements, importance of the software, and meeting actual working conditions. A whole new method of training in principles and procedures of engineering supervision while drilling using LWD systems is discussed. A high effectiveness of the method is attained through on-line simulation of the directional drilling process. An applicant must drill a well comprising three or five well course sections in a virtual environment. A detailed description of Slide Master – Version 1.18 directional drilling simulator is presented, including characteristics, available versions, system requirements, and safety precautions, as well as the structure of the software. The description includes principles of operation, examples, verification and operation procedures for each simulator.

Key words: *directional drilling, software, process simulation, hole curvature parameters, Slide Master, counter torque, target area, Drilling Process simulator, BHA simulator, Tool Measure simulator, Directional Drilling simulator, selection of well course sections*