ECONOMICS AND MANAGEMENT

Kolbushkin Yu. Reducing tax burden on oil and gas enterprises as a factor of the country’s economy improvement

The article gives proposals on reduction of tax burden on oil and gas enterprises.

Key words: energy carriers, taxes, production, profit, oil and gas enterprises, hydrocarbons, rent payment.

Kovalko O., Homyk P., Andrievskyi A., Trusova M. Priority directions of updating the standardization system in the oil and gas sector

The article analyses the state of the oil and gas sector standardization system. Priority directions for its updating considering the obligations to implement the regulatory framework of the European Community are defined.

Key words: oil and gas sector standardization system, conflicting national standards, harmonization of national regulations and Company's standards with international and European standards.

OIL AND GAS GEOLOGY

Koval V., Homyn O. Comprehensive approach to determining the nature of a producing horizon saturation

The article deals with the peculiarities study of initial phase state for one of the producing horizons, developed by PJSC 'Ukrnafta'. Geological structure of deposit and its development were described. Special attention was paid to the initial phase state of fluid.

Data of oil differential distillation, oil and gas component composition, hydrodynamic studies of wells, fluids production, reservoir pressure measurements and reservoir-producing mechanism were analyzed. Based on this results deposit was currently classified as oil deposit. Saturation pressure, molar mass of oil, gas content of oil, volume factor at original reservoir pressure and at bubble point
pressure were also determined. Oil fluid characteristics as a function of bubble point pressure were visually represented.

Comparative estimation of hydrocarbons initially in place by volumetric method and material balance method based on reservoir recovery was conducted. Material balance equation is universal to determine the initial moles amount of substances regardless of initial phase condition, reservoir drive mechanism, but taking into account the compressibility of rock and water, volume of extracted and injected water.

Practical implementation of modern mathematical methods for determination the reservoir fluids properties and reserves estimation.

**Key words**: reserves, oil, gas, phase equilibrium, material balance.

**Lebid V.** On favorable preconditions of petroleum potential of the basis-and-genesis complex in Dnipro-Donets sliding. Part II. Features of formation of natural reservoirs in a base-genic complex

Built schematic diagrams of these sub that formed the basis for consideration of the main features of their formation and structure. Resulted characteristic of these types of traps productive unconventional oil and gas. It is shown that the productive reservoirs will be located on the slopes of the Precambrian basement performances. Based on the characteristics of these reservoirs accommodation offered oil and gas search using directional wells. Then trunk vertical trap performance is evaluated on a slope performance crystalline basement (upper sub) and horizontal - trapped in surface of Precambrian (lower sub).

**Key words**: basis-and-genesis petroleum complex, unconventional traps, crystalline basement high slopes.

**WELL DRILLING**

**Ohorodnikov P., Svitlytskyi V., Ivankiv O., Poliovyi A.** Evaluation of reliability of drill string elements considering stochastic dynamic variable loads
There was made an evaluation of reliability of the elements of drill string elements considering stochastic dynamic variable loads. It is shown that evaluation of the durability of a particular element of the string with possible vibrations is possible after determining the RMS stress of subsequent calculation, equivalent in relation to fatigue stress for purely harmonic load of drill string elements.

**Key words:** reliability, elements, drill string, stochastic, dynamic, variable load.

*Panevnyk O., Kontsur I., Panevnyk D.* Determination of operating parameters of the device for cleaning the bottom hole

*Downhole ejection systems allow you to save economically feasible oil production at late stages of field exploitation. The growth in the use of the oil in the jet pump leads to the need for further development of theoretical issues aimed at improving the accuracy of prediction of sensitive operational parameters during the implementation of ejection technologies.*

*Proposed by the authors mathematical model of the working process of the downhole ejection system provides the classical method for determining the operating point of the pumping unit based on the joint solution of the equations of the characteristics of an oil jet pump and hydraulic system in which it operates. The mathematical model includes the equation of the pressure characteristics of a jet pump obtained using the hydraulic form of the equation of conservation of momentum of the fluid. The equation characteristics of the hydraulic system are derived on the basis of the preliminary analysis of the nature of flow distribution in bottom-hole zone of the well and determine the pressure in the discharge, suction and working lines. In the process of determining the pressures in the ejected flow characteristics of the filter of the reservoir fluid in the productive horizon. Methods of assessing losses in the suction line of a jet pump involves a preliminary determination of the velocity and Reynolds number of flow in the channel tubing.*
The use of oil jet pump is determined from the condition of maximum allowable mode of its operation and presents as a combination of the limit values of the depth of the installed ejection system in the borehole and the flow rate of the working stream.

Obtained through the conducted research the predictive value of the ejection coefficient and relative pressure of the jet pump can be used at the design stage of exploitation of oil wells.

**Key words:** jet pump, well, cleaning the bottom hole, parameters of use, operating mode.

**OIL AND GAS PRODUCTION**

Shveikin O., Khvostova O., Tkachenko V., Ivashechko D. Optimization of operating modes of natural gas dehydration adsorption systems

Recently, the usage of technological process of extracting of the excess moisture by using solid adsorbents have been increasing in places of preparation of natural gas by the gas producing industry of Ukraine. The problem of choosing the optimal mode of exploitation of natural gas dehydration systems using adsorption method of removing moisture is considered in this article.

Currently operating modes of adsorption systems of natural gas draining are regulated by the producer in view of averaging out the value of conditions of usage. It does not take into account the possible changes in technological modes of exploitation and thermodynamic parameters of gas, from which the moisture will be removed.

The authors of this article suggest application of techniques that allow to determine the optimal technological mode for drying gas with solid desiccant. Application of this methodology allows maximum use of the adsorbent capacity to absorb excess moisture contained in natural gas, extend the period of its operation, reduce operating costs, to ensure continuity of operation and prolong maintenance-free operation of gas equipment. The results of testing of these methods at PC UkrGasVydobuvannya that proved their ability to predict the
operating modes of adsorption systems of natural gas draining and the feasibility of using the proposed method for this purpose are presented in this article.

**Key words:** adsorption, operating mode, optimization, regeneration of the adsorbent, dew point temperature, capacity of the absorber.

OIL AND GAS TRANSPORTATION AND STORAGE

Andrusiak A. Diagnostic evaluation of the oil pipeline aboveground passage strength in continuous use

*The article developed methodology for diagnostic evaluation of stress-strained state oil pipelines of underground passages, which are constructed in mountainous areas. Done mathematical formulation and obtain analytical solutions boundary problem describing the behavior of overground oil transition under maintenance loads. Been applied improved rapid method of determining the real characteristics of the material pipe in the field. The results of research aimed at developing methodology engineering evaluation of the stress-strain state transitions aboveground pipeline, which was built in mountainous areas. To perform power analysis pipeline modeled tubular rod that is adjacent to the elevated transition areas in contact with dirt basis for the hypothesis Fuss-Winkler. At the final stage of assessing the strength elevated transition portrayed thin-walled shell. This move allowed the simulation overhead to consider the influence on the behavior of soil base oil properties, and thus present the final results in the form of simple analytical expressions that are useful for engineering practice. For actual design of the overhead switch oil pipeline "Druzhba" on the basis of the results is based distribution efforts and displacements along the axis of the structure. Attention is paid to the nature of redistribution efforts in oil pipeline by changing the stiffness of soil base and the edge effects that occur in the surrounding areas of elevated transition. The possibility limiting transition to the calculation results that are obtained with the unit "hard" model building. Given the two-dimensional thermoelastic state oil specified maximum axial stresses that*
occur during its operation. The final assessment of the strength of the energy carried by the criterion.

**Key words:** aboveground passage, pipeline, elastic foundation, continuous use.

**OIL AND GAS PROCESSING**

Chervinskyi I., Hrynyshyn O., Korchak B. Regeneration of spent petroleum oils using the thermal-oxidative method

*Nowadays in a world practice of waste oil products utilization the main attention is paid to waste oils regeneration for returning it to an entire usage. The combined methods are used for renewing the operational properties of waste oils, which include some intermediaries, based on physical, chemical and physicochemical processes. But the biggest disadvantage of such processes is a formation of an aggressive waste which should be neutralized. The actual problem is the creation of less popular new waste oils regeneration technologies.*

The paper has studied the possibility of waste oils regeneration by thermooxidative method. For establishing the optimal process conditions the influence of technological factors (temperature, duration and pressure) on operational indicators of regenerated oil should be regarded.

The waste motor oil, got from car service, was used as initial waste oil. It was characterized by kinematic viscosity $\nu_{50}=21,38 \text{ mm}^2/\text{s}$, $\nu_{100}=5,38 \text{ mm}^2/\text{s}$; index viscosity (IV) 122; the acid number (AN) 6,98 mg KON/g; the saponification number (SN) 116,24 mg KON/g and the ester number (EN) 109,26 mg KON/g.

The experimental laboratory adjustment consists of a reactor block, compression system and air purification, cooling and catching gaseous reaction products and devices for regulating and measuring temperature, pressure and oxidant waste.

*On the basis of the experiment results it has been defined that the temperature, pressure and process duration had essential influence on operational indicator of regenerated oil.*
The regenerated oil was got under the optimal process conditions (temperature 200 °C, pressure 2.0 MPa, duration 3 hours), the characteristics are AN 1.32 mg KON/g; SN 34.57 mg KON/g; EN 33.25 mg KON/g. These indexes are higher than current demands for motor oils, but decreasing the operational indicators of waste oils in 3-5 times shows the possibility of using this regeneration method in the industrial scales.

This waste oil regeneration method can be used as one of the phases of multi stages regeneration process with sorption or hydrogenation methods.

Key words: spent oil, thermal-oxidative regeneration, oxidation, acid number, saponification number, ester number.

AUTOMATION AND INFORMATION TECHNOLOGIES

Bilynskyi Y., Hladyshevskyi M. New ultrasonic method for measurement of fluid environments' flow rate

It is proposed a new amplitude frequency method for the measurement of flow speed based on the use of ultrasonic transducer near zone, as well as a mathematical model of ultrasonic waves' distribution in fluid environments. We have conducted experimental research, which allowed to confirm the mathematical model's adequacy and effectiveness of the proposed method.

Key words: ultrasound, amplitude frequency flow meter, near zone, meter, flow rate.

LABOR AND ENVIRONMENT PROTECTION

Antropchenko A., Radomska M., Cherniak M., Boichenko S. Evaluation of non-carcinogenic health risk for population from emissions of hydrocarbons from the reservoir of a typical filling station

The wide distribution of sources of environment pollution with hydrocarbons raises the topicality of the problem of petrochemicals influence on human organism. Since the activity of fuelling stations imposes serious risk to human health, it is necessary to assess the potential risk levels and define possible
approaches to prevention of negative consequences of such technogenic objects influence. The application of the health risk assessment procedure provides a range of advantages for the development of health protecting measures as compared with traditional methods based on comparison of actual pollution levels with corresponding standards.

Application of this methodology which includes two basic interdependent elements—risk assessment and risk management,—enables interpretation of potential threat to the human health from the harmful factors of fueling stations functioning and determination of costs on prevention and mitigation of predicted consequences within the framework of the integral decision-making process.

**The research purpose** is the assessment of non-carcinogenic population risk and determination of timeintervals until the display of negative symptoms in human organism under the influence of petrochemicals, emitted from the reservoirs of typical filling station.

The paper presents calculations of non-carcinogenic population risk from the exposure to petrochemicals vapors, resulted from operation of fuel tanks at gasoline stations. The calculation results and predicted time of adverse health changes display for the population in the exposure area have been analyzed and recommendations have been developed.

**Key words:** filling station, petrochemicals, non-carcinogenic health risk.