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**Draft technical regulations of the Eurasian economic Union
«On safety of oil prepared for transportation and (or) utilization»**

Keywords: organochlorine and formaldehyde compounds, technogenic impurities; hydrogen sulfide; mercaptans.

Abstract. The object of technical regulation of the draft technical regulation of the Eurasian economic Union «On safety of oil prepared for transportation and (or) utilization» is oil produced in circulation and in circulation within the EAEC. PJSC «NC «Rosneft» open the target investment project «Study of the negative impact of natural and man-made impurities in the commercial oil equipment, oil refinery catalysts, oil quality and oil products and development of recommendations for its reduction». The project is tasked to perform the JSC «VNII NP». The results of the work are intended to be used in the development of the rules.

The All-Russian Research Institute for Oil Refining [VNII NP]

Fedorov I.I.

**Problem of formation of atypical organic sulphur deposits in heat exchange equipment
at primary oil refining units**

Since 2011 at some oil refineries of Russia a strange situation appeared, when a large number of untypical specific deposits were being formed, thus filling the upper outlets of stripper columns, atmospheric distillation and gasoline stabilization towers. To a different degree, but practically all the refineries of Central region of Russia faced the similar problem.

High-quality analyses allowed to find a large number in deposits (from 15 to 90% by mass) of organic sulphur-containing compounds, and to assume the most probable source of their origin, too: at the oil preparation places reagents are being applied – hydrogen sulfide absorbers on the basis of formaldehyde. At the facilities of oil preparation there is no information on the possible risks connected with usage of the formaldehyde containing and triazine reagents. Works in this direction are now just beginning.

PJSC «MidVolga Scientific Research Institute of Petroleum Processing»

**PETROLEUM PRODUCTS:
TECHNOLOGY, INNOVATION, MARKET**

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Problems of the increasing use of natural gas as a motor fuel

Keywords: piston engine, natural gas, motor fuel, motor oil, ecology.

Abstract. This article is devoted to one of the most important areas of natural gas use as a motor fuel - in stationary engine, which are the main generators of electricity and thermal energy in remote areas of the country. The article is aimed at revealing the problems of creating gas engines based on diesel prototypes and possible solutions are founded upon domestic technological and design developments. As well as the optimization of the diesel engines parameters using mathematical models of the process and its individual stages is considered in this article. Important issue is the engine oil for modern piston engines. Engine oil performance and its physicochemical characteristics must compete with the foreign analogues. It is shown that the use of natural gas and pyrolysis gas of the local energy raw materials (coal, peat, etc.) as a motor fuel for power plants will solve the problem with an energy supply of the Far North regions and reduce emissions of carbon dioxide in order to solve the global problem of climate change.

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**Delayed cocking technology with application of thermal oxidative heating
of heave residue in transfer pipeline**

Keywords: cocking, air-steam mixture to transfer.

Abstract. The technology of delayed cocking includes the heating of secondary feed after the furnace in the cooled from the outside transfer pipeline, with partial oxidation of feed with air-steam mixture. The technology is aimed at the increase of time between overhaul of the unit.

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The research of the effect of oxidation products on the viscosity-temperature characteristics of motor oils

Keywords: the process of oxidation, the optical density, coefficient of relative viscosity index, the exponent of thermo-oxidative stability.

Abstract. The effects of research of influence of oxidation products of motor oils of different varying basic framework on the viscosity index are presented. The exponent of thermo-oxidative stability considers ratio of optical density of oxidation motor oils to coefficient of relative viscosity index. It was found that, regardless of the basic framework with a low temperature test exponent of thermo-oxidative stability increases at a constant value of the optical density.

FSAEI HVE «Siberian Federal University»

Medzhibovskiy A.S., Moykin A.A., Nazarova T.I., Yanovskiy L.S., Ezhov V.M., Sharanina K.V.

Investigation of the efficiency of sterically hindered phenols as antioxidants for lubricating oils

Keywords: oil for aircraft turbine engine, synthetic oils, antioxidant additives, sterically hindered phenols.

Abstract. The results of effectiveness research of the antioxidant additives K-135 produced by "NPP Kvalitet" within the automotive and aviation lubricants are given. The possibility of using the additive K-135 in engine oils as well as oils for aviation gas turbine engines to replace an import analog is shown.

ANALYTIC METHODS FOR OIL and PETROLEUM PRODUCTS

Glagoleva O.F., Belova O.A., Spuskova N.V., Sadyrov A.U., Piskunov I.V., Chernisheva E.A.

Development of NIR-spectrometry methods for express- analysis of crude oils and products properties on refinery

Keywords: NIR-spectrometry, oil disperse systems, blending, distillation, non-additive behavior, non-linear properties.

Abstract. On LUKOIL-NNOS refinery method of NIR-spectrometry is successfully used for analysis of oil products. It is an effective, reliable, convenient method for routine measurements; it can be used for analysis of crude oil and black products as well. But high complexity and colloidal structure of these products and non-linear behavior of their properties make this task not a simple one. On refinery was started a project of distillation process optimization via blending crude oil with effective additives. Having synergy with implementation of the new express-method, this work can be accelerated, and better accuracy of measurements can open new possibilities for optimization.

LUKOIL-Nizhegorodnefteorgsintez LLC

Russian State University of Oil and Gas named after I.M. Gubkin

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The influence of inhibitors based on derivatives of phenol on chemiluminescence at photo- and thermal oxidation of engine oil

Keywords: free radicals, oil hydrocarbons, thermo and photothermochemiluminescence, engine oil, inhibitors of photo and thermal oxidation, two-photon processes of photoexcitation.

Abstract. It have been investigated the thermal and photo-oxidation engine oil before and after addition of phenol derivatives based inhibitors. The efficacy of inhibitors in the oxidation of the engine oil was studied by the thermal methods thermo and photothermo chemiluminescence. The mechanisms of photo- and thermal oxidation of engine oil before and after the addition of inhibitors are discussed. The intramolecular and intermolecular energy transfer during photooxidation of engine oil before and after adding inhibitors has been investigated.

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MATHEMATICAL SIMULATION

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Modeling of raw materials composition for production of the road petroleum bitumen from «dry» tar

Keywords: modeling of composition, dry tar, heavy tar, petroleum, oxidized bitumen, diluent, raw materials composition, production of bitumen.

Abstract. The article is devoted to the preparation of the raw material composition for producing high-quality road bitumen from high viscosity materials. Attention is drawn to the urgency of the task for modern asphalt production.

It is known that when using a high viscosity tars deteriorate the low-temperature properties of the resulting oxidized bitumen. To improve these parameters is necessary to introduce to the raw material additional components, containing a significant amount of paraffinic-naphthenic hydrocarbons.

Case studies were carried out on the basis of which was defined the optimal quality indicators of the blending raw materials. The ability to use the resulting raw materials blends for the production of high-quality bitumen was confirmed by experimentally obtaining oxidized bitumen in the laboratory. Samples of road bitumen in three grades were obtained: BND 35/50, BND 70/100 and BND 50/70, which are indicators of quality in full compliance with the requirements of GOST 33133-2014.

Since the viscosity of the tar supplied to the bitumen production, may vary over a wide range, it becomes necessary to regularly adjust the feed amount of diluent. To simplify this operation, the mathematical model of raw material composition was developed.

Initial data for calculations were the results of empirical research, obtained on the basis of laboratory PJSC «MidVolgaNIINP». The tar samples with relative viscosity values from 150 to 350 sec were prepared. For every tar sample was found percentage of diluent required to bring the mixture to the desired quality parameters.

Mathematical relations have been defined on the basis of the experimental part of the research, and a mathematical model of the raw materials blend composition, consisting of two components, was developed. The resulting model allows the calculation by specifying the required mixing ratio for the subsequent adaptability of the results in industrial productions.

Using this model can significantly simplify the process of preparation of raw material for oxidation in an industrial environment, and to minimize losses on the relevant stage of production.

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