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SCIENTIFIC-ORGANIZATIONAL FUNDAMENTALS OF GEODYNAMICAL MONITORING OF OIL AND GAS OBJECTS IN THE BARENTS SEA REGION WITH A VIEW TO PROTECT NATURAL-ENGINEERING ENVIRONMENT (p. 5)

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Scientific-organizational fundamentals of geodynamical monitoring of oil and gas objects in the Barents Sea region have been developed with a view to protect natural-engineering environment. Authors’ methodological approaches and concept of geodynamical monitoring of oil and gas objects are given for the Barents Sea region taking into account tectonic-physical aspects of the region and including in-situ measurement complexes of geodynamically hazardous zones using relevant control methods, prediction calculations and modelling, experts’ assessments of natural and man-made impacts on oil and gas objects with a view to predict and reveal hazardous deformation processes formation at early stages for executive decision-making and preventive measures.

Key words: Barents Sea region; oil and gas object; geodynamics; monitoring; safety; environment.

ENVIRONMENTAL MANAGEMENT IN TERMS OF THE CASPIAN REGION OIL AND GAS FIELDS DEVELOPMENT (p. 10)

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Rapid growth of energy consumption in the conditions of hydrocarbon raw materials supplies exhaustion, as well as of negative effect of fuel and energy complex enterprises on all the objects of environment results in the necessity of forming in consciousness of people of new ideology – normative consumption of natural resources, creation and introduction of the system of industrial and ecological safety.

Modern trends of raw mineral-material base of the Caspian region development suppose permanent increase of volumes of the conducted geological survey works and also events on the increase of development rates of already existent deposits of minerals. Most actually this question is put up in the area of development of the investigated region oil and gas potential. This tendency is an objective necessity, both from economic and social point of view.

At the same time the territory of the Astrakhan area is unique with the special natural objects having a world value. And this fact requires maximally hard and absolute implementation of existent ecological requirements during realization of any types of the industrial development of bowels of the earth resource potential in its limits.

Key words: Caspian region; especially protected natural territories; power resources; oil and gas fields; continental shelf; underground waters; mineral waters; balneological resources; industrial safety; ecological safety.
RESEARCH INTO COMPOSITION AND METHODS OF APPLICATION OF APPD – OIL PRODUCTION SOLID PETROLEUM WASTE (p. 16)

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Asphalt-pitch-paraffin deposits (APPD) arising under oil and field equipment cleaning are petroleum waste that are to be neutralized and utilized for environmental impact reduction. Apart from the other oil slurries APPD are characterized with high organic components content that allows to consider them as alternative raw material or half-finished material for manufacturing of different products. In this paper the composition and physico-chemical properties of various Udmurtia oil fields are specified. The possibility of APPD application as film-forming inhibited oil composition (FIOC) for temporal equipment anticorrosive protection is estimated. The coatings based on organic fraction of deposits demonstrated satisfactory results and can be considered as slushing lubricants for inter-operation protection of metals as well as the base for FIOC production.

Key words: asphalt-pitch-paraffin deposits (APPD; petroleum residues; film-forming inhibited oil composition; secondary resources.

ENVIRONMENTAL ASPECTS OF SUBSTANDARD GENERAL PURPOSE RUBBER DISPOSAL (p. 22)

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The article deals with the possibility of general purpose rubbers production waste recycling, which are disposed in test grounds, by thermal cracking. For their recycling full-scale plane was developed which held cracking rubber in SKIZ and BSK leading to the formation of gaseous (up 12 %), liquid (50...62 %), solid (8...15 %) products and water (8...15 %). The composition and structure of liquid hydrocarbons characterized by the physico-chemical characteristics and the NMR 1H spectrum correspond to gasoline and diesel fractions. The toxicity and hazard rating of cracking products of substandard rubbers were determined. It was demonstrated that the COD value of the products hydrous part may be reduced to acceptable value.

Key words: NMR spectroscopy; rubber; cracking products; toxicity definition.

DYNAMICS OF EXOGENOUS GEOLOGICAL PROCESSES ON THE SOUTH-RUSSIAN – PURTAZOVSKAYA GAS PIPELINE (p. 26)

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Monitoring was carried out on the gas pipeline in the zone of permafrost. It is determined that its construction resulted in scale activation of exogenous geological and cryogenic processes which develop poorly in natural conditions. Most actively in technogenic transformed conditions the processes of thermal erosion and erosion, flooding and overflowing are being developed. Besides subsidence of gas pipeline roller soils and backfilling occur. In the initial period of operation thermokarst and thermosuffosion having local spreading are being developed. The pipeline monitoring in 2011 showed that in the process of operation general stabilization of EGP and overgrowing of surfaces subjected to their influence occur. However part of processes such as thermokarst and soils subsidence continue to maintain high activity.

Key words: exogenous geological processes (EGP); cryogenic processes; permafrost; gas main pipeline; monitoring.

RATED JUSTIFICATION OF AUDITING HATCHES PARAMETERS IN A CASE OF ELEVATED TRANSITION FOR ITS DIAGNOSING (p. 31)

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The article deals with the possibility of general purpose rubbers production waste recycling, which are disposed in test grounds, by thermal cracking. For their recycling full-scale plane was developed which held cracking rubber in SKIZ and BSK leading to the formation of gaseous (up 12 %), liquid (50...62 %), solid (8...15 %) products and water (8...15 %). The composition and structure of liquid hydrocarbons characterized by the physico-chemical characteristics and the NMR 1H spectrum correspond to gasoline and diesel fractions. The toxicity and hazard rating of cracking products of substandard rubbers were determined. It was demonstrated that the COD value of the products hydrous part may be reduced to acceptable value.

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Key words: exogenous geological processes (EGP); cryogenic processes; permafrost; gas main pipeline; monitoring.
When laying pipeline over the earth through natural and artificial obstacles (ravines, streams, rivers) often a simple design of the elevated transition of the pipeline in the pipe of bigger diameter possessing bigger flexural rigidity is used. The main problem for this type of a design is hidden nature of pipelines defects and damages development of pipelines under a case. There are data on emergency destructions of the elevated transitions in a case. Destructions were accompanied by a significant ecological damage because of transported hydrocarbons entry a river network over which elevated transitions in a case. There are data on emergency destructions of the elevated transitions allowing to set optimum parameters of the elevated transitions in a cover and to reduce risk of emergency destructions were laid.

The rated model of auditing hatches optimization in a case of the elevated transitions allowing to set optimum parameters of hatches in a case taking into account the actual stressed deformed state of the pipeline and an available stock of flexural tensions is developed.

Dependence of change of the pipeline flexural rigidity depending on the size of a deleted fragment of a case is received.

The algorithm of the element calculation of optimum parameters automated certainly of the hatches in a case is developed. Performance of auditing hatches in a case allows to carry out pipeline diagnosing in a cover and to reduce risk of emergency destruction with ecological consequences on particularly responsible sites – transitions of pipelines through water barriers.

Key words: main gas pipeline; case; elevated transition; rated model; ecological consequences; durability.

ENVIRONMENTAL ASSESSMENT IN THE AREAS OF OIL PRODUCTION BY ENGINEERING AND ENVIRONMENTAL SURVEYS (p. 35)

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The results of the researches into the quality of air, surface water objects, groundwaters, soils, subsoils, the state of animal and plant world in the oil production area are given.

Materials are obtained during engineering and environmental surveys in the design phase of the construction. The results of engineering and environmental studies form the basis for environmental impact assessment of scheduled economic activities to organize industrial environmental monitoring and decision-making about the approximation of surveyed area to all ecological and environmental laws.

The authors give a forecast of possible changes in the environment influenced by the anthropogenic impact when placed on the territory of the tank farm storage of oil products. Some measures to prevent, minimize or eliminate undesirable environmental, social, economic and other consequences are suggested.

Key words: environment; engineering and environmental survey; pollutants; oil products; environmental impact assessment; minimising of ecological consequences.

GIS TECHNOLOGIES FOR MONITORING OF ANTHROPOGENIC IMPACT OF ASSOCIATED GAS BURNING PRODUCTS ON THE ENVIRONMENT (p. 41)

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In the fields territory vast trains of aerosol contamination are formed around the flares of associated gas burning. We have considered the application of GIS technologies for environmental monitoring of anthropogenic impact of associated gas burning products in flares. The procedure of mapping thermal anomalies and environmental risk of plant community affection by gas burning has been developed on the base of Landsat satellite images and MODIS products.

Key words: associated petroleum gas; atmospheric pollution; satellite images; digital maps.

INTERNATIONAL EXPERIENCE OF SHALE GAS FIELDS DEVELOPMENT: ENVIRONMENTAL IMPACT (p. 46)

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On the base of American and British papers data the environmental consequences of shale gas fields development as applied to the impact on atmosphere air, bowels of the Earth, landscape, surface and subsurface waters were analyzed.

Key words: shale gas; hydraulic fracturing of formation;
waters of inflow; impact on atmosphere air; impact on bowels of the Earth; impact on ground waters.

OVERVIEW OF GERMAN LEGISLATION IN THE FIELD OF STANDARDIZATION OF HYDROCARBONS EMISSIONS FROM VERTICAL STEEL TANKS (p. 54)

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In connection with Russian Federation integration into European community technical regulations and procedures are being corrected. The research deals with German legislation in the field of hydrocarbons emissions determination and procedures of oil products emissions from vertical steel reservoirs. In German legislation the Law on protection from emissions determines only principal requirements. But technical details which are of great importance for practice are regulated in numerous Decrees on the order of Law execution (Ger. – BlmSchV). The legislative documents of lesser importance are the base for Air quality control guide, such as different DIN standards and VDI management directives. The article deals with principles which are described in management directive VDI 3479. Shortcomings and problems of using mentioned technique in Russia are shown in the article.

Key words: evaporation; emissions; reservoir; oil; oil products; fuel losses; standardization of emissions; normal decrease.