

ANNOTATED LIST OF ARTICLES IN THE COLLECTION

UDC 553.98:622.279

Skorobogatov V.A. Mineral Resource Base of Gas Industry in Russia: Development Prospects / V.A. Skorobogatov, S.N. Sivkov, S.A. Danilevsky // Challenges of Supplying Resources to Gas Producing Regions of Russia to 2030: collection of scientific articles / Edited by V.A. Skorobogatov – Moscow: Gazprom VNIIGAZ LLC, 2011. – P. 5–14.

The development of the mineral resource base is the foundation of Gazprom's development that provides explored gas and liquid hydrocarbons (condensate and oil) reserves to current and new large gas production centres onshore and on the shelf of Arctic and Far East seas of Russia.

The article looks at the prospects of the development of the mineral resource base in Russia. The issues of gas and oil exploration works today and principles of the development of the mineral resource base and hydrocarbon reserves growth have been analyzed. The article describes main strategic areas of geological exploration and provides the forecast of the scope of expected reserves in explored fields.

UDC 551.763:622.279

Karnaikhov S.M. The Age of Cenomanian Gas: "From the Dawn to the Sunset" / S.V. Karnaikhov, V.A. Skorobogatov, O.G. Kananykhina // Challenges of Supplying Resources to Gas Producing Regions of Russia to 2030: collection of scientific articles / Edited by V.A. Skorobogatov – Moscow: Gazprom VNIIGAZ LLC, 2011. – P. 15–25.

In 2012 it will be 50 years since the discovery of the first field in the north of West Siberia – Tazov gas field in the Cenomanian layers. The discovery of the first Cenomanian deposit that later turned out to be by no means the largest by reserves was the beginning of the "Age of Cenomanian gas" in the development of the gas industry in Russia.

Due to 50 years of active development of hydrocarbon resources of West Siberia and, primarily, the Cenomanian gas Russia in 1970-s became the leader in production and export of mineral energy carriers and preserved the leading position in the beginning of XXI century.

UDC 553.981:550.8

Korotkov B.S. Gas Potential of Deep Horizons / B.S. Korotkov, S.B. Korotkov // Challenges of Supplying Resources to Gas Producing Regions of Russia to 2030: collection of scientific articles / Edited by V.A. Skorobogatov – Moscow: Gazprom VNIIGAZ LLC, 2011. – P. 26–31.

The article is devoted to scientific and methodical aspects of increasing efficiency and promising areas of prospecting large natural gas fields in Pre-Ural foredeep, Caspian depression, North Caucasus and West Siberia.

UDC 622.279:553.98

Perlova E.V. Unconventional Gas Resources (Hydrate, Coal and Shale Gases) – Global Experience and Development Prospects in Russia / E.V. Perlova // Challenges of Supplying Resources to Gas Producing Regions of Russia to 2030: collection of scientific articles / Edited by V.A. Skorobogatov – Moscow: Gazprom VNIIGAZ LLC, 2011. – P. 32–38.

At present unconventional hydrocarbon sources are considered as real power sources of the future. A number of countries are implementing long-term Programs of their development at the state level. In Russia due to giant explored reserves of conventional hydrocarbons unconventional gas resources have been subject to very few studies. Since 2009–2010 due to significant success of foreign colleagues in this area the Security Council of the Russian Federation, the Ministry of Natural Resources and the Ministry of Energy of Russia have started to pay close attention to the development of unconditional hydrocarbon resources. Today the Government of the RF initiated the development of the governmental Program "On development of the mineral and resource base and hydrocarbon production from unconventional sources", which primarily requires detailed and objective analysis of unconventional gas development abroad and adjustment of positive experience of foreign colleagues to Russian conditions.

UDC 553.981.2(571.121)

Ayrapetyan S.A. Assessment of the Scope and Reliability of Undiscovered Gas Resources of the Yamal Peninsula and the Distribution Pattern of Discovered Reserves / S.A. Ayrapatyan, E.D. Kovaleva // Challenges of Supplying Resources to Gas Producing Regions of Russia to 2030: collection of scientific articles / Edited by V.A. Skorobogatov – Moscow: Gazprom VNIIGAZ LLC, 2011. – P. 39–43.

The article analyzes the distribution pattern of fields and local deposits by size. The left-unsymmetrical distribution of fields and local deposits by quantity and right-unsymmetrical distribution by the volume of ultimate reserves/resources by categories has been discovered.

The close correlation was determined in field reserves and resources distribution by pay deposits.

The determined pattern of gas reserves and forecast resources distribution in the Yamal oil and gas bearing region should be taken into account when choosing main areas of geological exploration to enhance their efficiency.

UDC 553.98

Kichenko V.E. Current Data on Oil and Gas Bearing Capacity of Paleozoic Deposits of the North of YNAD / V.E. Kichenko, I.V. Istratov, S.M. Karnaukhov // Challenges of Supplying Resources to Gas Producing Regions of Russia to 2030: collection of scientific articles / Edited by V.A. Skorobogatov – Moscow: Gazprom VNIIGAZ LLC, 2011. – P. 44–58.

According to the results of geophysical data interpretation, foundation blocks of different age in the north of YNAD are located at the depths of 8–15 km. Paleozoic deposits overlaid by a thick (5–8 km) formation of platform (Upper Triassic and Cenozoic) and terrigenous-volcanic (Permian-Triassic) deposits occur in the major part of the studied area. The achievement of commercial inflows of mainly gas and gas condensate, water of flow rate of over 50 m³/day, and oil in several areas at depths starting from 6500 m (superdeep wells) and geophysical data interpretation results allow to forecast the discovery of gas condensate deposits in Paleozoic (mainly carbonate) formations.

UDC 553.048(571.1)

Skorobogatov V.A. Enhancing the Reliability of Hydrocarbon Reserves Calculation (on the example of Yamal fields of West Siberia) / Challenges of Supplying Resources to Gas Producing Regions of Russia to 2030: collection of scientific articles / Edited by V.A. Skorobogatov – Moscow: Gazprom VNIIGAZ LLC, 2011. – P. 59–64.

The article deals with main types of uncertainties, errors and mistakes occurring during hydrocarbon reserves calculation. The article provides the most wide spread weak points of current technical and methodical approaches to hydrocarbon reserves calculation in West Siberia.

The method of zone regionalization and application of regional models for correlation of accumulated geological and geophysical data by separate regions in order to enhance the reliability of reserves calculation.

UDC 551.24(571.121)

Podurushin V.F. Tectonic Structure of the Foundation and its Impact on the Development of Gas Potential of the Yamal Peninsula / V.F. Podurushin // Challenges of Supplying Resources to Gas Producing Regions of Russia to 2030: collection of scientific articles / Edited by V.A. Skorobogatov – Moscow: Gazprom VNIIGAZ LLC, 2011. – P. 65–72.

The analysis and generalization of RWM CDP seismic exploration data on the relief of the surface of the Paleozoic foundation (reflecting horizon A) of the Yamal Peninsula allowed to describe the tectonic structure of the lower structural level and its impact on the location of gas fields.

UDC 553.981

Perlova E.V. The North of Nadym-Pur-Taz Region – the Primary Hydrate Gas Development Site in Russia / E.V. Perlova, S.A. Leonov, Yu.A. Ukhova // Challenges of Supplying Resources to Gas Producing Regions of Russia to 2030: collection of scientific articles / Edited by V.A. Skorobogatov – Moscow: Gazprom VNIIGAZ LLC, 2011. – P. 73–77.

The promising method of enhancing the mineral resource base is prospecting, exploration and development of natural gas hydrates located in permafrost areas. Russia as a northern country has significant prospects

in this area. According to a number of economic factors, the primary test sites for studying continental gas hydrates are above-pay strata of Gazprom's fields located in the north of Nadym-Pur-Taz region.

UDC 553.98:622.24

Polozkov A.V. Identification of Gas Hydrate Zones in Low-Temperature Rocks During Well Construction and Expected Types of Gas Hydrate Deposits / A.V. Polozkov, D.A. Astafyev, V.A. Istomin, K.A. Polozkov, P.I. Gaftunyak // Challenges of Supplying Resources to Gas Producing Regions of Russia to 2030: collection of scientific articles / Edited by V.A. Skorobogatov – Moscow: Gazprom VNIIGAZ LLC, 2011. – P. 78–86.

To identify the hydrate formation zones in rocks of the upper sedimentary cover of arctic basins, the integrated method of special processing of standard logging data and well thermal logging data has been worked out. This method allows to identify frozen, thawed, water-cut and gas hydrate rocks and deposits in the section during well construction. The method for mapping such deposits has been suggested. The results of studies allowed to identify gas hydrate deposits during well construction at Zapolyarnoye, Bovanenkovo and other hydrocarbon fields. The article describes various types of traps of gas hydrate and under-hydrate gas deposits in permafrost areas.

UDC 553.98

Silantsev Yu.B. Caspian Depression. Gas Potential Development Issues / Yu.B. Silantsev, G.R. Pyatnitskaya // Challenges of Supplying Resources to Gas Producing Regions of Russia to 2030: collection of scientific articles / Edited by V.A. Skorobogatov – Moscow: Gazprom VNIIGAZ LLC, 2011. – P. 87–90.

At present the system of split-level gas production centres has been established in the Caspian depression. However, gas potential development is hindered by low information value of performed geophysical studies as well as high content of aggressive components in gas. The article looks at the challenges of developing gas potential of the Caspian depression, tectonic genesis of the region, hydrocarbon ontogeny, substantiates the possibility to forecast sweet gas zones.

UDC 553.98(571)

Silantsev Yu.B. Resource Potential of the Sakha Republic (Yakutiya) – Dynamics and Prospects of Production Capacities / Yu.B. Silantsev, T.O. Khaloshina // Challenges of Supplying Resources to Gas Producing Regions of Russia to 2030: collection of scientific articles / Edited by V.A. Skorobogatov – Moscow: Gazprom VNIIGAZ LLC, 2011. – P. 91–95.

The article is devoted to the current condition of the resource potential of Yakutiya, analyzes the structure of original hydrocarbons in place. The analysis provides the foundation for forecasting possible hydrocarbon reserves growth under different scenarios. The geological simulation modeling provided the matrix of fields differentiation by the volume of reserves and production capacities.

UDC 551.345(571)

Yurova M.P. Development Prospects of Oil and Gas Bearing Territories of the Sakha Republic (Yakutiya) / M.P. Yurova // Challenges of Supplying Resources to Gas Producing Regions of Russia to 2030: collection of scientific articles / Edited by V.A. Skorobogatov – Moscow: Gazprom VNIIGAZ LLC, 2011. – P. 96–99.

The article considers the development prospects of oil and gas bearing territories of the Sakha Republic (Yakutiya) – Nepsko-Botuobinskaya antyclise (NBA) and Vilyuyskaya syncline. NBA fields discovered and prepared for commercial development should be developed first due to their connection to the federal ESPO route crossing the southern and central Yakutiya. The promising deposits of this region comprise Sorbian-Cambrian deposits of Nyuysko-Dzherbinskaya depression adjacent to NBA. Weathering crusts of the foundation are also of special interest in this region. The eastern areas of the Sakha Republic – Khapchagaysky megalithic bank, Sredne-Tyungsky high which oil and gas bearing capacity is connected with Triassic and Low Jurassic deposits – are considered promising for near future development. The same rocks on the slopes of Loglorsky megalithic bank, Lindenskaya and Tangnarinskaya depressions and other structures of Vilyuyskaya syncline are considered potentially promising.

UDC 553.98

Istratov I.V. Challenges of Development of Residual Hydrocarbon Potential of the Central, West and East Pre-Caucasus Region / I.V. Istratov // Challenges of Supplying Resources to Gas Producing Regions of Russia to 2030: collection of scientific articles / Edited by V.A. Skorobogatov – Moscow: Gazprom VNIIGAZ LLC, 2011. – P. 100–106.

Due to the relevant target of developing residual hydrocarbon potential of the Pre-Caucasus subsurface and deep deposits of foredeeps, the stratigraphic intervals and foundation and sedimentary cover volumes have been updated to substantiate the promising areas of geological exploration works with account of structural correspondence of section surfaces, lithological, storage, filtration and other properties of mine rocks at depths over 4500 m.

The difficulties in developing the residual hydrocarbon potential of Pre-Caucasus subsurface in identified promising zones and stratigraphic intervals are caused by not only large depths of not yet discovered deposits in foredeeps, but also possible "contamination" of oil and gas of Upper-Jurassic pay beds by sour aggressive components. The platform areas (depths below 5 km) will have more favourable industrial conditions for hydrocarbons discovery. However, the main difficulties in prospecting and development of these resources are caused by the lack of reliable caps and insignificant volume of hydrocarbons in deposits. Only offshore areas of the Black and Caspian Seas may have quite large deposits.

UDC 553.98

Akhiyarov A.V. Conditions of the Development of the Astrakhan Gas Condensate Field and Prospects of New Discoveries in the Astrakhan Dome Area / A.V. Akhiyarov, E.E. Polyakov // Challenges of Supplying Resources to Gas Producing Regions of Russia to 2030: collection of scientific articles / Edited by V.A. Skorobogatov – Moscow: Gazprom VNIIGAZ LLC, 2011. – P. 107–123.

The article looks at the prospects of subsalt horizon of carbonate deposits of the Caspian depression in connection with potential new discoveries in the Astrakhan dome area of both large HC accumulations comparable with reserves of the Astrakhan gas condensate field (GCF) and small fields – satellites of the Astrakhan GCF.

UDC 550.8

Akhapkin A.A. Digital Regional Geological and Geophysical Model of Sedimentary Basins / A.A. Akhapkin, Ya.I. Shteyn // Challenges of Supplying Resources to Gas Producing Regions of Russia to 2030: collection of scientific articles / Edited by V.A. Skorobogatov – Moscow: Gazprom VNIIGAZ LLC, 2011. – P. 124–130.

The article summarizes the experience of generating a unified geological and geophysical model of one of the largest oil and gas basins of Russia. It looks at collection and correlation of input data, provides the technology of model design and describes areas of its further development.

UDC 550.8

Korotkov S.B. New Forecast and Prospecting Geological Models in Seismic Exploration / S.B. Korotkov // Challenges of Supplying Resources to Gas Producing Regions of Russia to 2030: collection of scientific articles / Edited by V.A. Skorobogatov – Moscow: Gazprom VNIIGAZ LLC, 2011. – P. 131–136.

The article proposes principally new forecast and prospecting (preliminary) geological models (formation-block, massif-block and interblock) characteristic for deep deposits as well as mining rocks that were located at high depths during their development history. They can become a foundation for identifying best seismic exploration methods and technologies.

UDC 622.279

Geresh G.M. The Impact of Formation Pressure Reliability on Gas Reserves Assessment during Development / G.M. Geresh, O.A. Kontorschikova, M.P. Geresh // Challenges of Supplying Resources to Gas Producing Regions of Russia to 2030: collection of scientific articles / Edited by V.A. Skorobogatov – Moscow: Gazprom VNIIGAZ LLC, 2011. – P. 137–141.

The article deals with factors that have an impact on the correct identification of the depth of drained gas reserves. On the example of the Cenomanian deposit of one of West Siberian fields the impact of the

reliability of formation pressure on the assessment of drained gas reserves during development have been investigated.

UDC 553.982:550.8

Kuzmuk L.G. On the Role of Additional Exploration of Cenomanian Deposits of West Siberia on the Development Stage (on the example of the Yamburg GCF) / L.G. Kuzimuk, A.V. Chichmareva // Challenges of Supplying Resources to Gas Producing Regions of Russia to 2030: collection of scientific articles / Edited by V.A. Skorobogatov – Moscow: Gazprom VNIIGAZ LLC, 2011. – P. 142–144.

The additional exploration of the Cenomanian deposit of the Yamburg field on the development stage was carried out by seismic survey and drilling of exploration and vertical production wells to penetrate the gas-water contact. The results of additional exploration confirmed the important role of systematic updating of the geological model of deposit as well as permeability and porosity of reservoir rocks during deposit development and efficiency enhancement.

UDC 622.241.8

Cheltsov V.N. Vibrogeodynamic Cause of Cyclicity of Formation Pressure Dynamics in Idle Wells / V.N. Cheltsov, M.I. Miklyayev, T.V. Cheltsova, A.D. Lyugay // Challenges of Supplying Resources to Gas Producing Regions of Russia to 2030: collection of scientific articles / Edited by V.A. Skorobogatov – Moscow: Gazprom VNIIGAZ LLC, 2011. – P. 145–150.

2009 saw the establishment of the cyclic nature of formation pressure changes in idle gas wells of the Astrakhan GCF. It was assumed that the reason for this is the timing of geological environment compression and decompaction caused by the impact of regular forces of cyclic vibrogeodynamic genesis on the earth crust.

The article confirms the cyclic dynamics of formation pressures in other 13 wells of the Astrakhan GCF. Additional features and patterns have been determined.

UDC 553

Kosachuk G.P. The Content of Mineral Components in Salt Water of Nepsko-Botuobinskaya OGA and Their Commercial Value / G.P. Kosachuk, S.V. Burakova, N.B. Budrevich, E.V. Melnikova, S.I. Butchikina // Challenges of Supplying Resources to Gas Producing Regions of Russia to 2030: collection of scientific articles / Edited by V.A. Skorobogatov – Moscow: Gazprom VNIIGAZ LLC, 2011. – P. 151–157.

Waters of Sorbian terrigenous fields of the Neptsko-Botuobinsky region containing the significant amount of rare elements (bromine, magnesium, strontium, rubidium, lithium, kalium, etc.) are one of the main mineral resources and most important budget and capital intensive asset of Russia. The calculations performed for fields of the Timan-Pechora oil and gas bearing province provided the basis for the assessment of economic feasibility of recovering valuable components from hydromineral resources of Nepsko-Botuobinsky fields.

It was shown that commercial development of multi-component hydrocarbon fields of the Yakutiya gas production centre should be considered in terms of development priorities and designing new technologies which will significantly increase the economic efficiency of the gas production centre and ensure environmental safety of the region.

UDC 553.98

Izvekov I.B. Temperature and Pressure Conditions and Prospects of Oil and Gas Bearing Capacity of the North-Tazov zone of West Siberia / I.B. Izvekov, D.A. Soin // Challenges of Supplying Resources to Gas Producing Regions of Russia to 2030: collection of scientific articles / Edited by V.A. Skorobogatov – Moscow: Gazprom VNIIGAZ LLC, 2011. – P. 158–162.

The article describes temperature and pressure conditions of the sedimentary basin of the North-Tazov zone that are main factors having an impact on oil and gas bearing capacity of deep Cretaceous and Jurassic horizons on the north of West Siberian megaprovince.

UDC 553.98

Kovaleva E.D. Forecast of the Structure of Potential Discoveries of Gas Fields of Sedimentary Basins of the Russian Federation / E.D. Kovaleva // Challenges of Supplying Resources to Gas Producing Regions of Russia to 2030: collection of scientific articles / Edited by V.A. Skorobogatov – Moscow: Gazprom VNIIGAZ LLC, 2011. – P. 163–167.

Over 70 % of gas ultimate potential resources of East Siberian megacraton are located in small fields; the stock of large and medium-size gas fields is already prospected here. In near future the prospects of developing the HC potential of the majority of East Siberian region are connected with mostly medium-size and large gas fields. Small subeconomic fields will have undiscovered gas resources for a long time.

Therefore, such fields and similar territories, primarily, "mature" (in terms of prospecting) oil and gas bearing basins require the design of a new concept of HC potential development with maximum (specific) information support of resource unit development. The information support level should be increased by computer technologies used for information space organization.

The suggested distribution options, discovery structure dynamics model and results of geological simulation modeling are part of basin modeling required for long-term planning of investments, including planning the efficiency of geological exploration.

UDC 553.98:550.8

Kananykhina O.G. Geological and Innovative Support of Development of Russian Undiscovered Gas Resources / O.G. Kananykhina // Challenges of Supplying Resources to Gas Producing Regions of Russia to 2030: collection of scientific articles / Edited by V.A. Skorobogatov – Moscow: Gazprom VNIIGAZ LLC, 2011. – P. 168–172.

The article considers the need for geological innovative support adjusted for the targets of investment projects on various prospecting sites.

UDC 553.98

Vagin A.V. Assessment of Oil and Gas Bearing Prospects of the Domanic Deposits of the Upper Devonian Timan-Pechora Oil and Gas Bearing Province / A.V. Vagin // Challenges of Supplying Resources to Gas Producing Regions of Russia to 2030: collection of scientific articles / Edited by V.A. Skorobogatov – Moscow: Gazprom VNIIGAZ LLC, 2011. – P. 173–177.

The article looks at oil and gas bearing prospects of Domanic deposits of the upper Devonian province as an additional source of expanding the mineral resource base of the north-west of Russia.

UDC 55:005

Kryukova I.B. On Charting Triangular Diagrams in Microsoft Exel on the Example of the Shtokman Field / I.B. Kryukova // Challenges of Supplying Resources to Gas Producing Regions of Russia to 2030: collection of scientific articles / Edited by V.A. Skorobogatov – Moscow: Gazprom VNIIGAZ LLC, 2011. – P. 178–179.

The article describes the method of charting the granulometric triangle in Microsoft Exel by replacing the triangular coordinates by orthogonal ones.

UDC 553.98:550.8(571.1)

Medvedev A.G. Prospecting Hydrocarbon Fields in Eastern Regions of Pur-Tazov Area of West Siberia / A.G. Medvedev // Challenges of Supplying Resources to Gas Producing Regions of Russia to 2030: collection of scientific articles / Edited by V.A. Skorobogatov – Moscow: Gazprom VNIIGAZ LLC, 2011. – P. 180–183.

The article is devoted to studies of the geological structure and oil and gas bearing capacity of the West-Siberian oil and gas megaprovince.