

Chapter 1: Oil and gas resources on the Arctic Continental shelf in Russia

This Chapter gives a general overview of Russia's oil and gas industry on the Continental shelves of the Barents, Pechora and Kara seas. The chapter is informational in form and seeks to provide information on oil and gas fields, plans for their development, their infrastructure, and the companies operating on the shelves of these northern seas. The chapter also, to a certain extent discusses Russia's strategic plans for development of offshore fields in the Russian Arctic, and the development of subsoil regulations in Russia.

This chapter does not account for the environmental impact or risk such a development poses on the fragile arctic nature. For information about the consequences of oil and gas development in these seas, we recommend chapter 3 *Environmental risks when extracting and transporting oil and gas* and chapter 5 *Environmental Impact of oil and gas projects in the Arctic* of this report. Furthermore, chapter 4 about accidents and incidents in the Arctic should be of substantial interest for the observant reader. Chapter two will account for transport of oil and gas, as well as future plans for transport of oil and gas from the region.

The Chapter contains comments from specialists and legal experts, basic definitions of oil and gas objects, and illustrations.

1.1. Russia's oil and gas industry - a historical review

The first oil and gas fields

The decision to begin developing Russia's oil industry was taken in the 19th century when the first fields were discovered up in the Baku region, on the Apsheron Peninsula, and in the Caucasus. Next, oil was discovered in Krasnodar Krai, on the Cheleken Peninsula, in Timan-Pechora province, and on the island of Sakhalin.

Oil production in the early years of development of Russia's oil industry	
Year	Oil production, millions of tonnes per annum
1880	0.4
1886	1.9
1890	3.9
1896	7.1
1900	10.9
1910	11.3

Following the Russian Civil War (1918-1920), Russia's oil economy was completely destroyed. In May 1920, the Soviet authorities nationalised the Apsheron oil fields. As of 1920 in Russia, and 1923 in the whole Soviet Union (USSR), the oil industry only existed in the form of a State monopoly.

By 1945 over 150 oil and gas fields were discovered in the USSR. Just prior to and after the Great Patriotic War (1941-1945), fields were exploited in the Volga-Urals oil and gas-bearing oblast, while fields later appeared in West Turkmenistan, Kazakhstan, in Stavropol Krai, the Ukraine and Belarus.

The Soviet Union's oil and gas industry only entered a phase of systematic development in the post-war

For your information:
The first oil pipeline was built in the USA in 1865 and measured 6 km in length.

years. In the 1950s and 60s, one of the world's largest oil and gas bearing reservoirs was explored in West Siberia, and significant oil fields were discovered there. Intensive oil development and production began in the Tyumen district, key among the

petroleum-extracting districts of West Siberia.

The first system of pipelines for transporting hydrocarbons

The first pipeline in Russia was installed in 1878 in the Baku region and stretched from the oil fields to the oil refinery. From 1897-1907, the longest producing pipeline in the world at that time (835 km) was built between Baku and Batumi, with a diameter of 200 mm and 16 pumping stations.

The next step in the construction of oil industry installations was linked to the development of fields in Bashkiri, Tatari and the Kuibyshev oblast.

Initial offshore developments

The first offshore developments in the former USSR began in the 1920s on the Caspian Sea. The Caspian region became the focal point for analysing the technical characteristics of offshore oil fields. Here, the first trial was undertaken in relation to constructing drilling platforms. Sakhalin became the second such region.

The probability of opening up new, large-scale oil and gas deposits on the continent had already diminished by the start of the 1970s. At this time, exploration work on the Russian shelf proceeded very slowly. During this period, Soviet scientists substantiated the future prospects and actuality of conducting geological

survey work on the Continental shelves of seas within the Russian Federation with a view to discovering hydrocarbon deposits which could make up for losses in terms of mining deposits on land.

In order to create a stable energy base for the USSR, a resolution was passed on accelerating the development of offshore work on coastal sections of the Arctic waters. The shelves of the Arctic seas were seen as having a great potential, with estimated natural gas resources in the subsoil of the Barents, Pechora and Kara Seas alone of 70 trillion cubic metres.

For your information:

A **Continental shelf** is the flattened part of the underwater, outlying bedrock adjoining the mainland, which is characterised by a common geological formation.

The first geophysical surveys of the Barents Sea were conducted by specialists of the Arctic Geology Research Institute (Leningrad) in 1962. In January 1979 the Murmansk marine, geological, geophysical, oil

Here's a thought...

According to data from Russia's Ministry of Natural Resources, there are 13 billion tonnes of oil and 20 trillion cubic metres of gas, in reserves which could be exploited by 2020. Around 66.5% of these resources are located on the shelves of the northern Barents and Kara Seas.

gas expedition "Soyuzmorgeo" of the Gas Industry Ministry of the USSR (now known as the "Sevmorneftegeofizika" state company) was established in Murmansk and, in July 1979, the "Arcticmorneftegazrazvedka" trust was created within the same Ministry. This heralded a new phase in the study and surveying of resources on the Arctic shelf¹.

By the end of 2002, in the Barents, Pechora and Kara Seas, and also in the Bay of Obsk, 15 oil and gas fields had been explored. In terms of size, three of these are classified as unique, nine as large-scale, two as being of average size and one small. According to the most recent estimates, up to 80% of Russia's potential oil and gas reserves are concentrated on the Arctic shelf².

Discussions about borders on the seabed and continental shelves' are currently a hot issue. Today, this is being regulated by the UN Convention on the Law of the Sea (UNCLOS), which opened for signatories in 1982, and was ratified in 1994. Russia, Canada and Norway are amongst the signatories.

The signatories have the exclusive right to the resources situated closer than 200 nautical miles from shore. The Arctic Ocean is shallow, and the continental shelf stretches longer than 200 miles. The Convention opens up for the signatories to manage territory outside the 200 mile zone, if this area is a prolongation of the continental shelf. In order to achieve this, the countries have to apply to the "commission on borders on the continental shelf", whose headquarters is located in New York. This commission determines the legitimacy and scientific foundation of the pretensions specified in the claim to expand the state's borders.

Countries which signed the Convention prior to 1994 may submit a claim until 2009.

In 2001, Russia filed an application to increase its continental shelf by 1.2 million square kilometres. At the end of 2006, Norway filed an application which challenges the same portion of the shelf as Russia.³ In order to justify a claim to expand their economic zone in the Arctic, Russia must prove scientifically that the shelf of the Arctic Ocean is an extension of the Siberian continental plateau. According to the All-Russian Scientific Research Institute of World Ocean Geology and Mineral Resources, potential hydrocarbon resources on this territory are not less than 9-10 billion tonnes of standard fuel⁴. Resolving this dispute is within the framework of the Convention, and the results will influence the oil and gas potential of two countries⁵.

1.2. Oil and gas raw material base on the Russia's Arctic shelf

According to Russia's energy strategy for the period up to 2020, energy policy priorities in the north-west federal district will entail development of the oil and gas industry on the coast of the Arctic Ocean and the shelves of the Arctic seas. The strategy stresses that the Yamal Peninsula and the waters of Russia's northern seas will become the strategic priority region in terms of gas production over the long term.

For your information:

Russia's energy strategy for the period up to 2020, which is affirmed by **Order (number 1234-r) from the Government of the Russian Federation dated August 28, 2003**, is a document which gives concrete expression to the aims, tasks and basic directions of the State's long-term energy policy over the corresponding period, taking into account the emerging domestic and foreign situation in relation to the energy sector. One of the instruments for implementing the energy strategy is a Federal programme entitled "An energy efficient economy."

Three energy strategies have been written during Russia's brief post-Soviet history. Declaring a commitment to basic values, such as energy self-sufficiency and security of the country, energy saving and a reduction in the negative impact on the environment, each new version of the strategy changes, along with the quantitative parameters, the principles of State policy. It may be that all three documents are combined into just one - not one of them has become a guide for authorities or for business ..." (Neftegazovaya vertical no 18/2005)

¹ www.komiinform.ru

² http://www.duma.gov.ru/cnature/press_club/tarasuk_xxivek.htm

³ Newspaper «Gazeta», 03.04.2007, Galina Antonova

⁴ <http://lenta.ru/news/2007/05/07/arctic/>

⁵ Newspaper «Gazeta», 03.04.2007, Galina Antonova

The opening up of fields in the Arctic region will be accompanied by a number of problems and require significant investment in connection with difficult natural climatic conditions, remoteness from existing oil and gas industry infrastructure. Furthermore, there is an urgent need to implement new technological solutions associated with production and transportation which guarantee conservation of the environment in the difficult conditions encountered in Polar Regions.

The current state of oil and gas development in Russia is characterised by a reduction in exploration, and low rates of regeneration. The volumes of geological survey work do not ensure regeneration of the mineral raw materials base within the oil and gas industry. The most profitable parts of the fields and deposits are being developed, not the more challenging ones.⁶ Oil and gas extraction on the principal mainland fields has fallen over the last few years. The probability of opening up new, large-scale hydrocarbon fields on the mainland had already decreased by the start of the 1970s. The yield of proven volumes of oil and gas resources present on the mainland currently stands at 50%.⁷

For the time being, oil and gas in the region in question is only being extracted on Kolguev Island and in Cape Kharasavey in the eastern part of the Barents Sea, as well as in the Bay of Obok.⁸ In 1998, at the Peschanoozer oil field on Kolguev Island, the Federal State unitary enterprise “Arcticmorneftegazrazvedka” extracted 26,000 tonnes of oil.⁹

For your information:

Potential Resources - this is the initial (i.e. prior to the start of industrial operation) volume of oil, gas and condensate in the subsoil of sedimentary structures, the industrial oil and gas content of which is proven by the results of geological survey work. The total potential resources are made up of volumes of cumulative extraction, current site reserves under categories A, B, C1i and C2, prospective resources in category D0 (C3) and predicted resources in categories D1 and D2. See end of this chapter for a thorough description of this system of classification.

According to estimates, the total potentially recoverable offshore oil and gas resources in Russia's are approximately 100 billion tonnes of oil equivalent (made up of 16 billion tonnes of oil and more than 82 trillion cubic metres of gas). The bulk of these resources (around 76%) are located on the shelves of the Barents and Kara seas

(fig. 1). Only 9-12% of the total potential offshore oil and gas resources on the Russian shelf have been explored.¹⁰

⁶ Russia's energy strategy for the period up to 2020. Affirmed by Order (number 1234-r) from the Government of the Russian Federation dated 28 August 2003

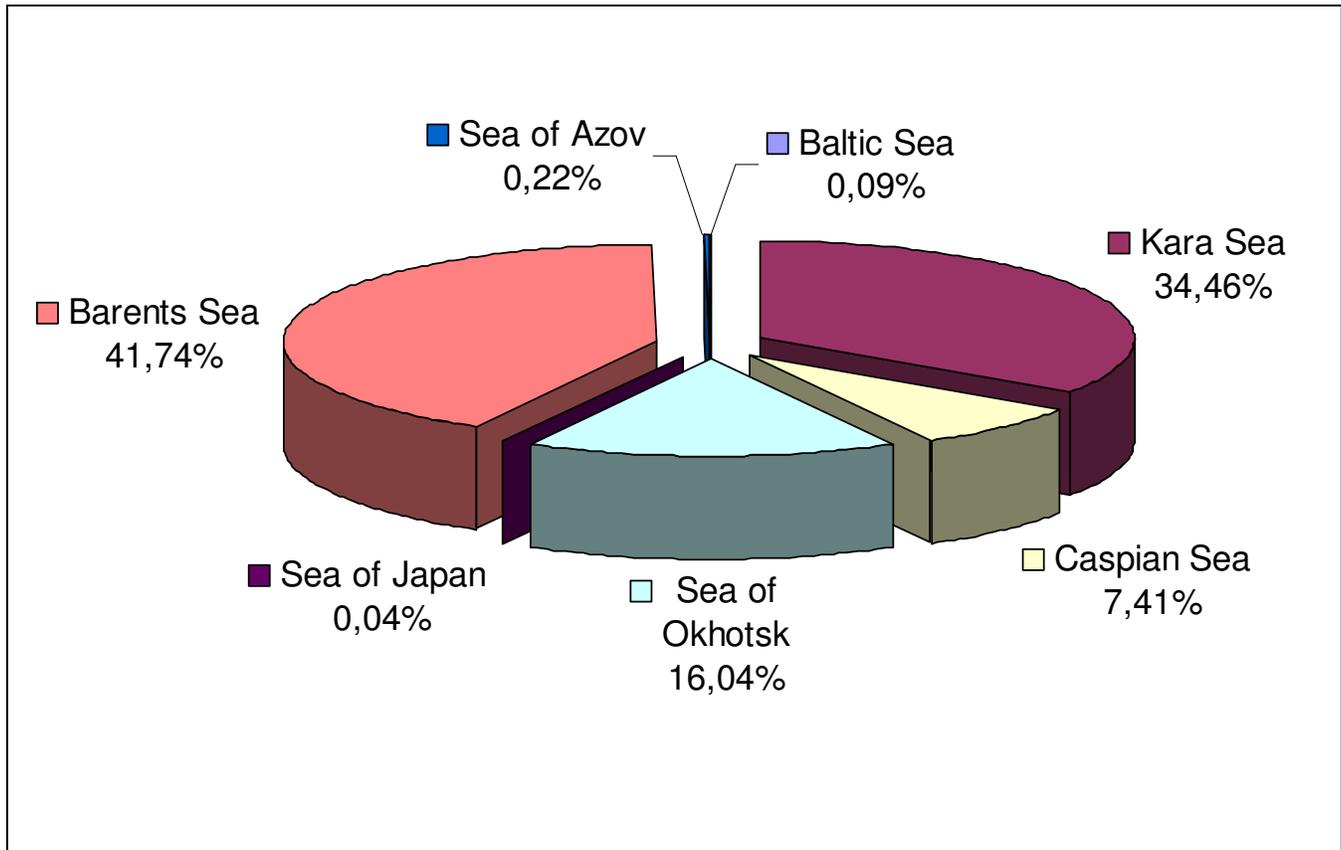
⁷ Alex Khrol. Shtokman may be a start. What next? PETRO magazine. Special edition. ONS 2006

⁸ http://www.murmanchanin.ru/mrm_oil_gas_news6.htm 11.10.05

⁹ <http://www.ashng.ru/company/stockholders/amngr/>

¹⁰ Russia's energy strategy for the period up to 2020. Affirmed by Order (number 1234-r) from the Government of the Russian Federation dated 28 August 2003

Fig. 1. The distribution of oil and gas reserves between the various seas on Russia's Continental shelf as estimated in 2005.



The Barents Sea region is primarily gas-bearing, according to estimates of the hydrocarbon potential which have been carried out since the start of the 1970s. According to estimates from the All-Russian Scientific Research Institute concerned with geology and mineral resources in the Pacific Ocean, recoverable oil resources in the Russian sectors of the Barents and Pechora Seas account for 9% of the quantity of the potential resources.¹¹

According to the Ministry of Natural Resources, the resources of Russia's continental shelf comprise 13 billion tonnes of oil and 20 trillion cubic meters of gas. The Ministry of Natural Resources foresees that if the pace of work on the shelf picks up, oil production will increase to 10 million tones by 2010, and to 95 million tonnes, by 2020, while gas will increase to 30 billion cubic meters and 320 billion cubic meters respectively.

In 1982 exploratory drilling began in Russian Arctic waters. Over the next three years, two gas fields, Murmansk and Severo-Kil'din, were explored in the Barents Sea. Five years later the Shtokman and Ludlov gas fields were explored for the first time. These fields are

are giant in terms of gas condensate reserves. An additional three fields were revealed during the Soviet era in the Pechora Sea: the Pomor gas condensate field in 1985, the Severo-Gulyaev oil and gas condensate field in 1986 and the large-scale Prirazlomnoe oil field, which was explored by the production organisation

For your information:
Structure - this term is used when determining appearance, size and shape, as well as the conditions under which rock-forming, mineral and organic components are to be found. The structure depends on the conditions under which the rock was formed. The variety of structures is assigned according to the appearance of the rock-forming minerals, the degree of crystallinity of the rock, the absolute and relative dimensions of the crystals, and so on.

¹¹ "OIL AND GAS RESOURCES IN RUSSIA'S NORTH-WEST REGION AND THE FUTURE PROSPECTS FOR ITS DEVELOPMENT", M.D. Belonin, O.M. Prishchepa (All-Union scientific research and geological exploration institute)

Arcticmorneftegazrazvedka, which is part of Glavmorneftegaz, in 1989.¹²

Recoverable potential resources of oil and gas are 22.7 billion tonnes in the Barents Sea. In the potential resources structure, gas-forming hydrocarbons predominate (21.6 trillion cubic metres), with liquid resources (oil and condensate) accounting for 1.1 billion tonnes. In the Pechora Sea, recoverable potential resources in terms of oil and gas are estimated at 4.9 billion. In this estimate, condensate accounts for 2.2 billion tonnes, and gas amounts to 2.7 trillion cubic metres.¹³

Within the oil resources structure, category D2 resources predominate. A large part of the oil resources are in the lowest categories, while all prospective (category C3) resources and reserves (categories C1+C2) are also concentrated in the Pechora Sea. For a throughout classification of the categories see the end of this chapter “*Classification of oil and gas Reserves*”.

For your information:

Field - a natural accumulation of mineral resources which, depending on quantity and quality and the prevailing economic conditions, may be the subject of industrial development.

Gas field - a natural, commercial accumulation of gas in the form of one or several isolated beds in various types of reserves with porous or fractured reservoirs confined to a local structural element of the Earth's crust which combines these beds over one area.

Oil and gas field - geological structures where geological formations possess one or more commercial oil or gas accumulations in the vertical cross-section.

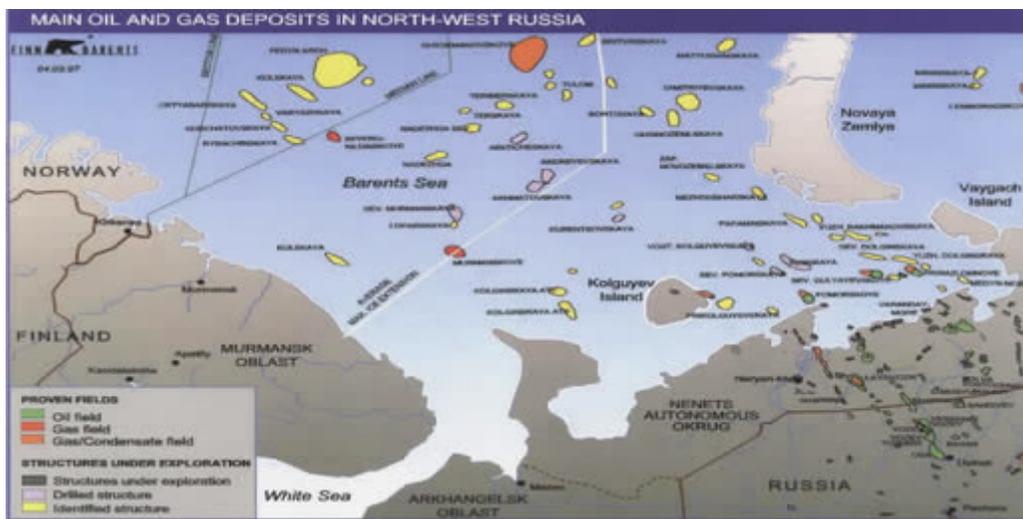


Fig. 1: Main oil and gas fields on Russia's West Arctic shelf.¹⁴

In the Barents Sea, oil fields have only been opened in the Norwegian sector. There is a prognosis that approximately 1 billion tonnes of recoverable oil resources exist in the Russian sector of the Barents Sea (including in the disputed area), but this is not proven. In the potential resources structure of the Barents Sea, gas dominates, with oil accounting for approximately 3%.

In total, 12 areas on the shelf of the Barents Sea (including Pechora) which may contain oil have been accentuated.¹⁵

For your information:

The “**Grey zone**” between Russia and Norway – a marine area disputed between Russia and Norway where vessels from both countries have the right to fish.

The territorial dispute between Russia and Norway on fishing issues in the Spitsbergen archipelago region dates back to the 1920s.

Since 1978, issues concerning the exploitation of fish have been resolved annually by agreements concluded between both parties.

¹² <http://www.gazprom.ru/articles/article14395.shtml>

¹³ “OIL AND GAS RESOURCES IN RUSSIA'S NORTH-WEST REGION AND THE FUTURE PROSPECTS FOR ITS DEVELOPMENT”, M.D. Belonin, O.M. Prishchepa (All-Union scientific research and geological exploration institute)

¹⁴ Source: Arctic Centre, Information Service, University of Lapland.

¹⁵ Oil in the Barents Sea. Valeriy D. KAMINSKY, Oleg I. SUPRUNENKO, Carina G. VISKUNOVA, Victoria V. SUSLOVA, All-Russian scientific research institute concerned with geology and mineral resources in the Pacific Ocean named after I.S. Gramberg, 7th INTERNATIONAL CONFERENCE AND EXHIBITION ON THE DEVELOPMENT OF OIL AND GAS RESOURCES IN THE RUSSIAN SECTOR OF THE ARCTIC AND THE CONTINENTAL SHELF OF THE CIS. RAO/CIS OFFSHORE 2005

Pechora Sea:

- the north-eastern part of the Arctic shelf which joins the oil and gas-bearing regions of Varandey-Adzvin and Khoreyver, and the oil and gas-bearing region of Gulyaev-Dolgin (section 1);
- the north-western part of Kolguev oblast (section 2);
- a part of the Korgin zone (section 3).

Among these, section 1 is regarded as having the richest oil resources. In the north-west part of Kolguev Island, these resources are only expected to occur in the smallest beds of oil reserves and, within the Korgin section, on composite beds with a significant share of oil.

The Barents Sea shelf:

- the Kola shelf (section 4);
- the central Barents Sea elevation (sections 5, 7, 8 and 9), a large part of which belongs to the area disputed between Russia and Norway;
- the northern part of the shelf (section 10);
- the Admiralty-Prinovozezel oblast (sections 11, 12);

Here's a thought...

According to specialists from the Norwegian companies, Statoil and Hydro, large oil and gas deposits are located in the "grey area" of the Barents Sea. However, because of the indeterminate nature of the borders, neither party can proceed officially with the study and exploration of these deposits.

Sections 5, 7, 8 and 9 are located almost entirely within the limits of the "grey area" on the central Barents Sea elevations. The northern part of the Barents Sea (section 10) may contain oil-yielding rocks which determine the possible existence of oil deposits. The Admiralty-Prinovozezel oblast (sections 11, 12) is considered promising in terms of its oil-bearing capacity.¹⁶

According to geologists, sections in the Barents Sea from Russkoye to the West Mitushinsky can contain from 180 to 700 million tonnes of fuel equivalent.¹⁷

For the time being, hydrocarbon extraction is only carried out on Kolguev Island and in the Cape Kharasavey district in the eastern part of the Barents Sea, as well as in the Bay of Obsk.¹⁸ In 2006, production on the Russian shelf comprised 4.2 million tonnes of oil – only 0.9% of the total production in the country.¹⁹

For your information:

Oil - a combustible, oleaginous liquid which is prevalent in the Earth's sedimentary crust. It is the most important mineral resource. A complex mixture of alkanes, several cyclanes and aromatic hydrocarbons, as well as oxygenous, sulphurous and nitrogenous compounds. In excess of 75% of the oil's general make-up centres on hydrocarbons. In addition to hydrocarbons, the substances found in oil in the greatest quantities are: sulphur, nitrogen and oxygen (up to 4% sulphur, 1% nitrogen and just under 1% oxygen).

A distinction is drawn between the following oil types:

low-density oil (0.65-0.87 g/cm)
 medium-density oil (0.871-0.91 g/cm)
 heavy oil (0.91-1.05 g/cm)

or depending on the quantity of sulphur admixtures:

low-sulphur (up to 0.5% S)
 medium-sulphur (0.5-2% S)
 high-sulphur (in excess of 2% S)

Table: Commercial fields in the oil and gas-bearing province of the Western Arctic shelf²⁰

Field, year opened	Hydrocarbon status	Size of the field
1. Pechora Sea		

¹⁶ Oil in the Barents Sea. Valeriy D. KAMINSKY, Oleg I. SUPRUNENKO, Carina G. VISKUNOVA, Victoria V. SUSLOVA, All-Russian scientific research institute concerned with geology and mineral resources in the Pacific Ocean named after I.S. Gramberg, 7th INTERNATIONAL CONFERENCE AND EXHIBITION ON THE DEVELOPMENT OF OIL AND GAS RESOURCES IN THE RUSSIAN SECTOR OF THE ARCTIC AND THE CONTINENTAL SHELF OF THE CIS. RAO/CIS OFFSHORE 2005

¹⁷ PBK Daily Ljudmila Podobedova 07.05.2007

¹⁸ http://www.murmanchanin.ru/mrm_oil_gas_news6.htm 11.10.05

¹⁹ BarentsObserver.com, 15 February 2007

²⁰ CONCEPTUAL BASES FOR ENGINEERING AND GEOLOGICAL SURVEYS OF THE OIL AND GAS-BEARING PROVINCE OF THE WESTERN ARCTIC SHELF. Kozlov S.A. All-Russian scientific research institute concerned with geology and mineral resources in the Pacific Ocean of the Ministry of Natural Resources in the Russian Federation, St. Petersburg, Oil and gas business journal, 2006 <http://www.ogbus.ru>

<i>Field, year opened</i>	<i>Hydrocarbon status</i>	<i>Size of the field</i>
Pomor, 1985	Oil and gas condensate	average
Severo-Gulyaev, 1986	Oil and gas condensate	average
Prirazlomnoe, 1989	Oil	large-scale
Varandey Sea, 1995	Oil	average
Medynskoye Sea, 1997	Oil	large-scale
Dolgin, 2000	Oil	large-scale
2. Barents Sea		
Murmansk, 1983	Free gas	large-scale
Severo-Kil'din, 1985	Free gas	average
Shtokman, 1988	Gas condensate	giant
Ludlov, 1992	Free gas	large-scale
Ledov, 1992	Gas condensate	large-scale
3. Kara Sea		
Rusanov, 1989	Free gas	giant
Leningrad, 1990	Free gas	giant

1.3. Strategy for developing the oil and gas potential of Russia's Continental shelf

The general situation in Russia can be characterised as a decrease in the explored oil and gas reserves and their lowered rate of production. The amount of geological surveying does not provide reproduction of the raw material base of the oil and gas industry. Development of only the most accessible and profitable deposits and reserves is taking place.²¹

According to Gazprom Russia's gas production capacity will rise after 2010 because of the opening of the deposits on the Yamal Peninsula, in the shelf of the Arctic seas, in the Bays of Obok and Tazov, in Eastern Siberia and in the Far East. The Yamal Peninsula is a strategic region for gas producing companies. It is one of the most promising oil and gas-bearing regions of Western Siberia. Twenty-six deposits are explored on the Yamal Peninsula, containing surveyed gas reserves holding 10.4 trillion cubic meters, - technically recoverable condensate reserves of 250.5 million tonnes, and technically recoverable oil reserves of 291.8 million tonnes²².

"Russia's energy strategy for the period up to 2020", affirmed by Order (number 1234-r) of the Government of the Russian Federation dated August 28, 2003, specifies development of the oil and gas extraction complex in Northwest Russia; the formation of new petroleum regions, an inter-regional transport system for energy carriers, and the role of oil and gas development in resolution of socio-economic problems.

Surveying and exploration in the following areas are determined as priorities by Gazprom:²³

²¹ *Russia's energy strategy for the period up to 2020. Disposals and sanctions by the Russian Federation Number 1234-, August 28 2003*

²² <http://www.gazprom.ru/articles/article20015.shtml>

²³ *IMPLEMENTATION OF THE EXPLORATORY WORK PROGRAMME BY THE gazprom ON THE ARCTIC SHELF OF THE RUSSIAN FEDERATION, Alexander N. TIMONIN, the "All-Russian scientific research institute concerned with natural gases and gas technology" limited liability company. Valentin A. KHOLODILOV, "Gazflot" state company. RAO/CIS OFFSHORE 2005*

- The Barents Sea; the region around the Shtokman field, the completion of prospecting and preparation of gas reserves at the Ludlov and Ledov fields, along with the exploration of the large-scale Fersmanovskaya and Demidovskaya structures.
- The Pechora Sea; the south-eastern shelf (the region containing the Prirazlomnoe and Dolgin fields) where the preliminary exploration of fields, and the emergence of structures adjacent to fields is planned.

For your information:

Drilling

- to make wells, to bore, to force open a well, the sinking of boreholes, **types:** core, percussion, roller-bit,
- an underground working process, principally a circular cross-section of the subsoil to allow study of the geological structure, as well as prospecting, exploration and the extraction of mineral resources.

Exploratory drilling

- drilling wells with the aim of exploring mineral resource sites and undertaking engineering and geological surveys. A widely used term in the oil and gas industry for deep wells intended for exploration of mineral resources on open fields, study of the geological profile in regions where little investigative work has been carried out, or to obtain geophysical variables. Depending on their purpose, all exploratory drilling wells are subdivided into the categories indicated below.

- The Kara Sea; in the waters of the Bays of Obok and Tazov, as well as the Priyamal shelf.

The following areas are to be developed subsequent;

the water areas of the inland fields in Kharasav and Kruzenshtern (giant in terms of reserves), the large Rusanov and Leningrad gas fields, and the prospective structures in the Nyarmey, Skuratov and Zapadno Sharapov coastal regions. The proposed realistic timeframe for conducting exploratory work at the Rusanov and Leningrad fields is 2015-2020. In total, it is believed that there will be an actual increase to 7 trillion cubic metres of gas based on the number of sites on the Priyamal shelf where drilling is planned to take place.²⁴

At the present time, the All-Russian Petroleum Scientific-Research Geological Exploration Institute within Russia's Ministry of Natural Resources is developing a "programme concerned with the integrated study and development of oil and gas reserves and resources in the north-west region", including a strategy for developing geological survey work, on the basis of energy strategy regulations.²⁵

The programme makes provisions for the regeneration of the oil and gas base which enables stable production in the event of the region's active

development and offers a strategic backup by providing energy security for both separate entities within the Russian Federation, and for the north-west region as a whole.²⁶

Annual gas production, in accordance with Gazprom's plans is projected to increase 10 billion cubic metres after 2010, increase 36 billion cubic metres in 2020, provided that the Shtokman field is developed, and possibly increase 60-90 billion cubic metres thereafter. According to statements made by Gazprom, the timeframe for developing the Shtokman field is primarily determined by the demand for gas and the resolution of the investment question.²⁷

For your information:

Gazprom accounts for 85.5% of Russia's gas production and one fifth of global gas production. Gas production volumes are as follows:

- In 2000: 523.2 billion cubic metres
- In 2001: 512 billion cubic metres
- In 2002: 521.9 billion cubic metres
- In 2003: 540.2 billion cubic metres
- In 2004: 545.1 billion cubic metres
- In 2005: 547.9 billion cubic metres

It is the intention of the Gazprom state company to increase the volume of gas production to 550-560 billion cubic metres by 2010 and to 580-590 billion cubic metres by 2020, this figure rising to 610-630 billion cubic metres by the year 2030.

²⁴ IMPLEMENTATION OF THE EXPLORATORY WORK PROGRAMME BY THE Gazprom ON THE ARCTIC SHELF OF THE RUSSIAN FEDERATION, Alexander N. TIMONIN, the "All-Russian scientific research institute concerned with natural gases and gas technology" limited liability company. Valentin A. KHOLODILOV, "Gazflot" state company. RAO/CIS OFFSHORE 2005

²⁵ "OIL AND GAS RESOURCES IN RUSSIA'S NORTH-WEST REGION AND THE FUTURE PROSPECTS FOR ITS DEVELOPMENT", M.D. Belonin, O.M. Prishchepa (All-Union scientific research and geological exploration institute)

²⁶ "OIL AND GAS RESOURCES IN RUSSIA'S NORTH-WEST REGION AND THE FUTURE PROSPECTS FOR ITS DEVELOPMENT", M.D. Belonin, O.M. Prishchepa (All-Union scientific research and geological exploration institute)

²⁷ "OIL AND GAS RESOURCES IN RUSSIA'S NORTH-WEST REGION AND THE FUTURE PROSPECTS FOR ITS DEVELOPMENT", M.D. Belonin, O.M. Prishchepa (All-Union scientific research and geological exploration institute)

Here's a thought...

In the period after 2010, plans are to ensure the forecasted gas production volumes through development of fields on the Yamal Peninsula, offshore fields the Arctic seas, in the waters of the Bays of Ob and Tazov, in Eastern Siberia and the Far East. The Yamal Peninsula is one of the company's strategic gas production regions. It is one of the most promising gas-bearing regions in West Siberia. Within the peninsula, 26 fields have been explored up, the gas reserves amount to 10.4 trillion cubic metres, recoverable condensate reserves equal 250.5 million tonnes and recoverable oil reserves are 291.8 million tonnes.

Using a more intensive development model for gas fields on the shelf of the Barents Sea, it is proposed that within as little as three years following development of the field, it will be possible to enter into the first stage of development with annual gas production volumes of up to 40 billion cubic metres, with a planned increase thereafter over the course of the next 6 years to 90-130 billion cubic metres (using the Shtokman field as a basis).²⁸

With the involvement in opening up fields located a relatively short distance from the shore of the Pechora Sea (the Prirazlomnoe, Varandey Sea, Medynskoye Sea, Dolgin fields and others), the growth in production volumes according to the moderate and optimistic models envisaged by the "Energy strategy" is deemed possible by 2017 - 2020, with levels of extraction between 50 and 60 million tonnes per annum accordingly (taking into account exploration and involvement of new fields). This will require an increase in excess of 900 million tonnes of oil reserves on dry land, and more than 250 million tonnes on the adjoining part of the Pechora Sea. These developments will require geological survey totalling USD 5.5 billion on dry land and in excess of USD 0.5 billion offshore. A large part of the expenditure for regenerating reserves on land must be covered at the expense of the subsoil users.²⁹

For your information.

The Russian companies are utilizing 30-35% of the resources in each field, the rest 65-70% are being left. This development is contrary to the rest of the world. For example, in the US in the period 1990-2000 the average coefficient rose from 0,35 to 0,41. In Russia in the same period it sank from 0,39 to 0,31.³⁰ *Source. The Press office Ministry of Resources Russia*

However, oil and gas extraction in Russia in recent years has largely increased using infrastructure established previously. In this connection, the majority of companies are increasing oil and gas extraction primarily by renewing the production-related and technical potential of fields brought on line previously in regions which have already been developed. The essential increase in production volumes will require investment in both prospecting and infrastructure creation. As regards the Shtokman field, this infrastructure will be unique.

In 2006, a new State strategy with regard to the development of the Russian shelf was actively discussed. One of the aspects of this strategy will be renunciation of the Law "on production sharing agreements" and the orientation towards Russia developing her resources herself. Gazprom, Rosneft and Zarubezhneft have been planning to establish a new State company for offshore development in the Russian Arctic. Bureaucrats started to talk of the possibility of creating a structure along these lines for the first time in the beginning of 2005. The Ministry of Natural Resources and the Industrial Energy Ministry repeatedly declared that it would not be possible to implement shelf-related projects without foreign investment, because it was difficult for Russian holding companies to compete with their foreign counterparts in carrying out auctions and bids on the Russian shelf. At that time, Minister Yury Trutnev proposed the creation of a special State company and its inclusion among the foreign consortia aiming to develop the shelf.

In 2007, however, it became clear that the all offshore licences to the fields on the Arctic shelf and on the shelf of the Far East of Russia, will be given to two state companies, Rosneft and Gazprom. It was also decided that participation in the development will be decided by competitions, not auctions. All these fields will receive tax benefits from the state, and the participation of foreign state companies will be decided individually.³¹ According to

²⁸ "OIL AND GAS RESOURCES IN RUSSIA'S NORTH-WEST REGION AND THE FUTURE PROSPECTS FOR ITS DEVELOPMENT", M.D. Belonin, O.M. Prishchepa (All-Union scientific research and geological exploration institute)

²⁹ "OIL AND GAS RESOURCES IN RUSSIA'S NORTH-WEST REGION AND THE FUTURE PROSPECTS FOR ITS DEVELOPMENT", M.D. Belonin, O.M. Prishchepa (All-Union scientific research and geological exploration institute)

³⁰ <http://www.priroda.ru/news/detail.php?ID=7637>

³¹ The Shelf is being divided between the state companies / gazprom and Rosneft gain tax exceptions
<http://www.kommersant.ru/doc.html?path=/daily/2007/095m/14939923.htm>

data from the Ministry of Natural Resources, offshore oil and gas recoverable resources in Russia are in excess of 100 billion tonnes. The ministry states that in 2020-2030, these recoverable resources which will become the base for extracting oil and gas in Russia. The main theme has become a discussion of the possibilities afforded the State in terms of consolidating their own resources for developing these riches.³²

This controversy together with the new politics of renationalization of the oil and gas resources is also a hot topic in Russia's relation to the European Union.

For your information:

The European Energy Charter was adopted by EU States in the Hague December 17, 1991. The purpose was to develop an efficient energy market throughout Europe. The parties which are signatories to the Charter must undertake activities to ensure co-ordination of their energy policies, collaboration and exchange of opinions. Access to energy resources and their development must be made easier for interested operator developers. Foreign investment must be stimulated and protected.

According to agreements between Russia and EU, European investors are to have the same access to the Russian energy market that Russian companies have to Europe's market, as well as the ability to export any gas and oil they produce in Russia. However, Federal Law No. 177 "regarding gas exports" assigns to Gazprom (or its wholly owned subsidiary) the exclusive right to export all forms of gas from all Russian fields. "This law sums up the controversy regarding ratification of the Energy Charter and the transit protocol - There is no sense in it continuing", argues Oleg Zhilin, Vice-President of the Russian Gas Committee.^[1] Thus, "Russia will not waive Gazprom's monopoly to transport gas but will ensure that independent producers have access", declared V. Putin. These questions will further intensify the contradictions in the energy sphere between Russia and the EU. In October 2006 during an EU-summit in Finland Russia rejected the proposed energy charter.

1.4. Oil resources on Russia's Euro-Arctic shelf

The Prirazlomnoe oil field

The Prirazlomnoe oil field is located in Russia's European (North) Arctic Continental shelf in the Pechora Sea, 60 km from the Varandey settlement (Nenetsky Autonomous District), 950 km from Arkhangelsk and 1025 km from Murmansk. The field, which is situated at a depth of 19-20 m, was discovered by the "Arcticmorneftegazrazvedka" State production complex in 1989 with the exploratory well Nr. 1 with a depth of 3100 m. A license to develop the Prirazlomnoe field was issued to Sevmorneftegaz in 2002.³³

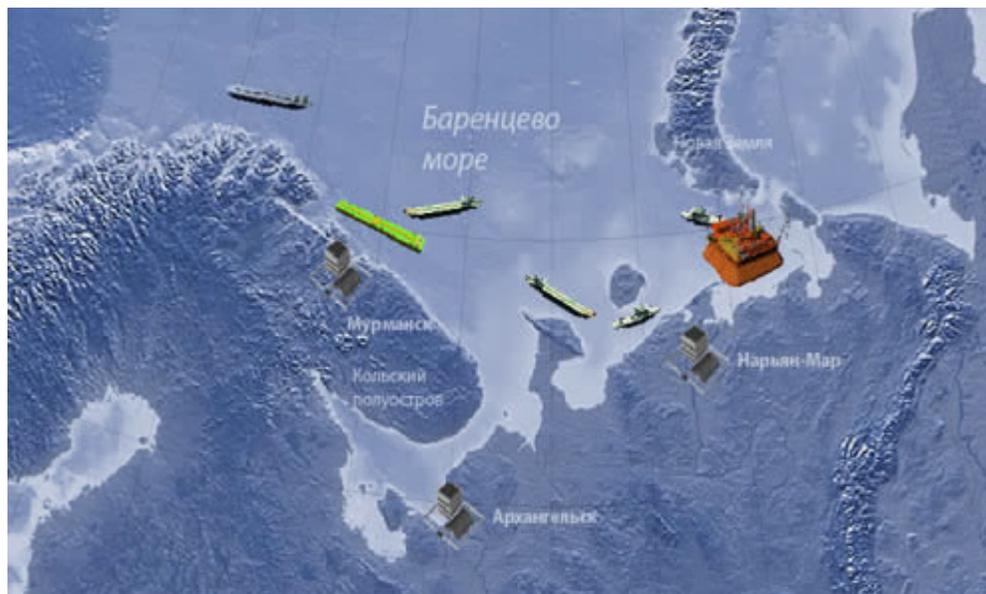


Fig. The Prirazlomnoe oil field.³⁴

³² <http://www.kommersant.ru/doc-y.html?docId=729120&issueId=30274>

¹ www.oilcapital.ru

³³ <http://www.sevmorneftegaz.ru/projects/pnm/index.html>

³⁴ <http://www.sevmorneftegaz.ru/projects/pnm/index.html>

For your information:

A chronology of the Prirazlomnoe oil field development:

1989 - field discovered

1993 - license issued to the "Rosshelf" public company. Construction began on the offshore ice-resistant stationary platform.

2000 - included in the production sharing agreement.

2002 - license transferred to the Sevmorneftegaz private company. Construction resumed on the platform. Sevmorneftegaz purchased the upper structure of the Hutton TLP platform.

2003-2005 - reconstruction and modernisation of the upper Hutton structure. Construction of the caisson and platform rigging.

exploratory wells have been drilled on the site, 4 of them did reveal productive deposits, while one (well number two) failed.

For your information: Read about the vulnerable environment and environmental challenge connected with oil and gas activity in the Arctic in chapters 3 and 4 of this report

The project to develop the offshore Prirazlomnoe field is a pilot project for all Russian companies operating on the Arctic shelf. The project has attracted significant interest and attention in the process of developing and organising the field.

Recoverable oil reserves from the Prirazlomnoe field are estimated at 83.2 million tonnes, with the maximum volume extracted annually amounting to 6.5 million tonnes. Gazprom estimates that in excess of USD 1 billion of investment will be needed up to 2012 in order to develop the field. By this time, the field will produce an annual output of 6.6 million tonnes of oil.³⁵ In total, 5

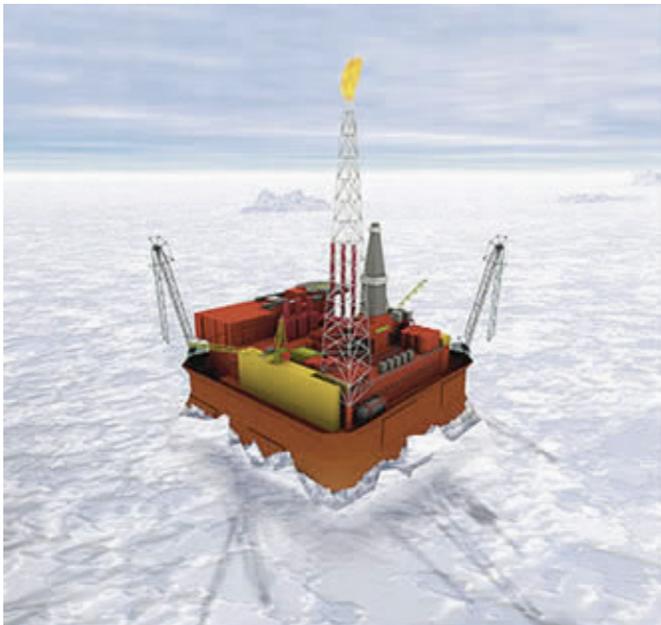
There are plans to drill 36 wells on the Prirazlomnoe oil field: 19 extracting wells, 16 injection wells and one specifically for pumping the waste materials arising from drilling into absorptive seams.

The project concerned with developing the Prirazlomnoe field has been executed by the All-Russian Scientific Research Institute for Natural Gases and Gas Technology. They have suggested that the infrastructure established in accordance with this project will become a basis for the subsequent development of oil and gas resources in the Barents and Kara Seas.³⁶

The main element of the Prirazlomnoe field is the steel, gravity-type, ice-resistant platform. This installation is supposed to be constructed in the central part of the field.

For your information:

Well construction makes provision for the "zero fault" principle. The commercial disposal of spent drilling fluid, sludge and other technological waste materials will take place in a specially drilled absorptive well (in seams of rock).



The Prirazlomnoe platform

Basic characteristics:

- Length - 126 m
- Width - 126 m
- Height above sea level - around 120 m
- Mass (excluding solid ballast) - 110,000 t
- (including solid ballast) - 506,000 t
- Number of wells - 40
- Overall capacity of the caisson - 159,890 m³
- Volume of oil in the tanks - 136,000 m³
- Level of maximum extraction per day - 20 748 m³
- Personnel - 160 individuals
- Period of self-regulation - 60 days
- Rated service life - 25 years (according to data from the official site of Sevmorneftegaz - 50 years)

Functions of the offshore ice-resistant stationary platform

- drilling wells;
- oil and gas extraction;
- oil storage;
- direct unloading of oil on to tankers.

Total capital investment in the design and construction of the platform amounts to USD 930 million.

Fig. The Prirazlomnoe offshore ice-resistant stationary platform.³⁷

³⁵ <http://www.oilru.com/news/32210/>

³⁶ <http://www.sevmorneftegaz.ru/projects/pnm/project/index.html>

³⁷ <http://www.sevmorneftegaz.ru/projects/pnm/platform/index.html>

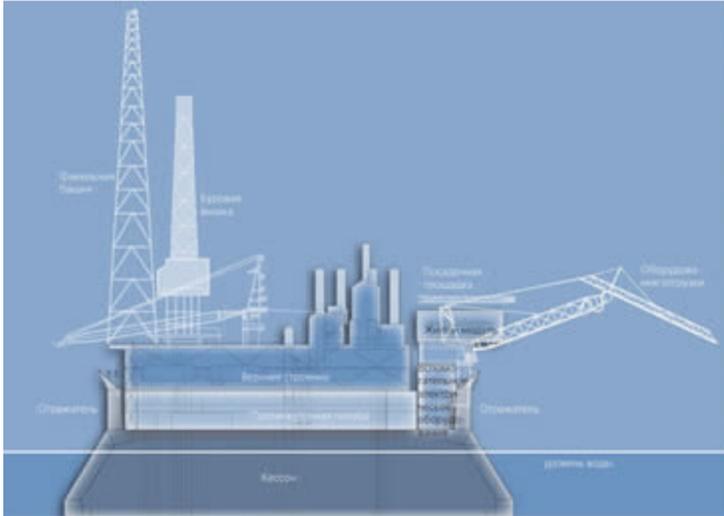


Fig. Schematic representation of the Prirazlomnoe offshore ice-resistant stationary platform.

oil storage tanks up to a total of 110,000 m³. The oil will be transported in shuttle tankers to the floating store in the Kola Gulf, and then by line tankers with dead weights of 120,000 tonnes, from where it will be exported.

For the purpose of safety in relation to filling, there is a proposal to use reinforced multifunctional ice class supply vessels to deliver supply loads and the conveyance of personnel to the platform. The vessels will also be used in emergency situations.

Offshore bases providing access to the Prirazlomnoe offshore platform will be accommodated for in Murmansk, Naryan-Mar and Severodvinsk. The base in Murmansk will take care of the reception, storage and shipment of supply loads received from the country's central regions as well as abroad. Cargo will mainly be supplied to the platform by the special fleet of the Sevmorneftegaz private company from Murmansk and Arkhangelsk, and partly by helicopters from Naryan-Mar. The production repair depot in Severodvinsk

**For your information:
Foreign partners**

More than 40 companies from 15 countries supply equipment for the Prirazlomnoe offshore ice-resistant stationary platform. The most extensive collaboration has been with Norwegian companies (volume of products supplied USD 56.8 million), companies from the UK (USD 27.8 million), Italy (USD 24.8 million), the USA (USD 13.5 million), Germany (USD 8.0 million), Holland (USD 6.8 million) and Sweden (USD 2.8 million).

**For your information:
A peculiarity of the platform**

The Prirazlomnoe platform has also been designed for the purpose of receiving oil from other fields. Sevmorneftegaz believes the platform effectively permits involvement in the development of small, adjacent oil and gas structures without constructing extra platforms.

The upper structure of the Prirazlomnoe platform is developed using the upper structure of the Hutton platform. The Hutton platform was for 15 years in operation in the North Sea for the British company Kerr Mc Geen, before it was sold to the Russians. The plan is to tow the 250,000 tonnes platform, to the site where the Prirazlomnoe field is situated. .

Oil prepared on the platform for transporting will accumulate in the platform's

**For your information:
Enterprises participating in the establishment of the infrastructure on Prirazlomnoe**

- the following Federal State unitary enterprises: the "Sevmashpredpriyatie" manufacturing department and the "Zvezdochka" municipal enterprise in Arkhangelsk oblast
- the Rubin marine engineering central design office
- the "Krylov Institute" a scientific research centre for shipbuilding named after the academic A.N. Krylov
- the "Prometey" central scientific research institute for construction materials in St. Petersburg
- the "Vyborgskiy" shipbuilding factory (a public company).

on the territory of the "Sevmashpredpriyatie" Federal State unitary enterprise (manufacturing department) will take care of repairs, assembly and testing of equipment needed for exploitation.³⁸

The Medynsko-Varandey licensed area

The Medynsko-Varandey section, covering a total area of 2,405 km², is situated in the south-eastern part of the Barents Sea, in the shallow waters of the Pechora Sea with depths of up to 19 m. The field is situated 1,000 km from Murmansk and 410 km from Naryan-Mar. The area has 6 basic structures, three in each of the sub-sections.

Potential oil reserves and resources (geological/recoverable) according to the licensed area are 700 and

³⁸ "ACTIVITIES UNDERTAKEN BY THE Sevmorneftegaz PRIVATE COMPANY IN THE DEVELOPMENT OF OIL AND GAS FIELDS ON RUSSIA'S ARCTIC SHELF", Ivan N. CHERNOV, Sevmorneftegaz private company. RAO/CIS OFFSHORE 2005

163 million tonnes respectively.³⁹



Fig. Licensed oil and gas areas in the Pechora Sea.

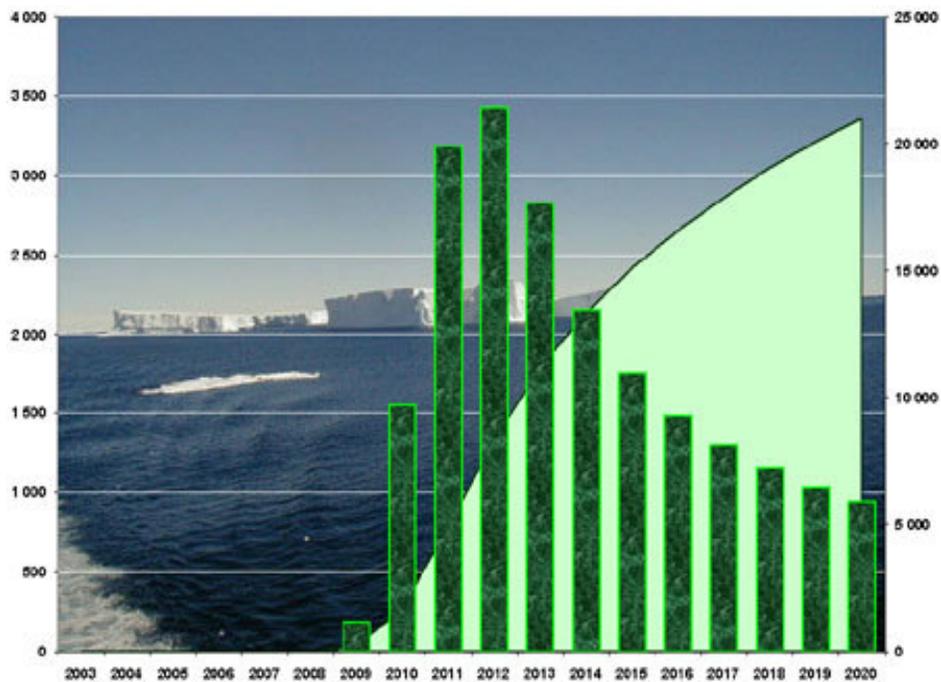


Fig. Oil output forecast up to 2020 - the Medynsko-Varandey licensed area.⁴⁰

Medynskoye Sea oil field

The Medynskoye Sea oil field was opened in 1997. The field is situated in the south-eastern part of the Arctic shelf of the Barents Sea in the shallow waters of the Pechora Sea, 23 km from shore (fig. 5). Sea depths in the area of the field vary between 10 and 18 m.⁴¹

³⁹ CONCEPTION OF THE DEVELOPMENT OF THE MEDYNSKO-VARANDEY LICENSED AREA IN THE PECHORA SEA, Boris K. Kutitchkin, the "Arctichelfneftegaz" private company - Yuri F. Federovskiy, the "Sintezneftegaz" private company - Leonid G. Kul'pin, the "Morneft" scientific research and design institute - Yuri A. Simonov, the Central scientific research institute named after the academic A.N. Krylov. RAO/CIS OFFSHORE 2005

⁴⁰ <http://www.ashng.ru/business/mining/prognosis/>

⁴¹ PRELIMINARY EVALUATION OF THE TECHNICAL SOLUTIONS FOR ESTABLISHING GROUPS OF WELLS WITH A VIEW TO

Oil exports are planned directly from Medynskoe by transshipment from the Kola Gulf (Lavna), or the Pechenga Bay. Destinations ports include Rotterdam and cities along the east coast of the USA. In order to

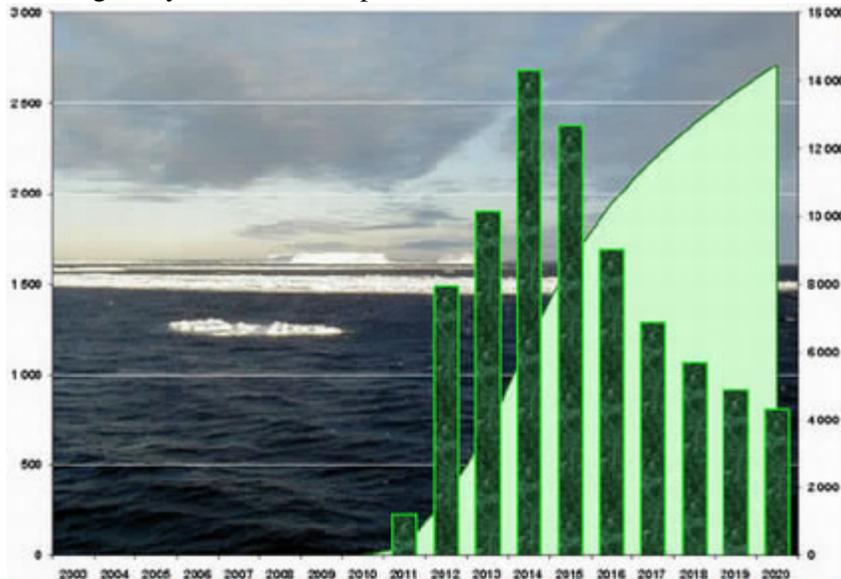


Fig. Oil output forecast up to 2020 - the Pomor licensed area.

export the oil, newly constructed shuttle tankers from the LU ice category are proposed with a minimum dead weight of 40,000 tonnes. To export raw oil directly from the platform, the use of existing Astrakhan type tankers with a dead weight in the region of 20,000 tonnes is considered a possibility. In order to export oil to the sales market, the leasing of line tankers with dead weights of up to 250,000 tonnes is being considered.⁴²

The Kolokolmor and Pomor licensed areas

These areas are situated in the southern part of the Pechora Sea. In this area, the sea does not exceed a depth of 40 m. The Kolokolmor area extends to 1,540 km², Pomor to 1,677 km². The nearest ports are Naryan-Mar (distance: 200 km) and Murmansk (800 km). Significant oil and gas resources have been revealed here. The estimate is that 300 million tonnes of oil may be recovered from these licensed areas.⁴³

The fields consist of a great number of seams, with hydrocarbons being found at depths ranging roughly from 1,000 to 4,000 m.

The right to use the subsoil in the Medynsko-Varandey, Pomor and Kolokolmor areas of the Barents Sea has been granted to the private company “Arcticshelfneftegaz” until 2025.

In accordance with the work programme for 2003, “Arcticshelfneftegaz” plans to execute a significant amount of geological exploration and technical measures aimed at preparing the licensed areas for development, as well as establish an infrastructure for extraction.⁴⁴

EXPLOITING THEM ALL YEAR ROUND FOR THE “MEDYNSKOYE SEA” OIL FIELD, Anton A. KHISTYAEV, Alexander A. NIKITENKO, Vladislav V. BESKHIZHKO, the “Morneftegazproekt” private company, Igor A. GORSHKOV, Yuri M. TRAPEZNIKOV, the “Malakhit” St. Petersburg maritime machine building office (a Federal State unitary enterprise). RAO/CIS OFFSHORE 2005

⁴² CONCEPTION OF THE DEVELOPMENT OF THE MEDYNSKO-VARANDEY LICENSED AREA IN THE PECHORA SEA, Boris K. Kutitchkin, the “Arcticshelfneftegaz” private company - Yuri F. Federovskiy, the “Sintezneftegaz” private company - Leonid G. Kul’pin, the “Mornefti” scientific research and design institute - Yuri A. Simonov, the Central scientific research institute named after the academic A.N. Krylov. RAO/CIS OFFSHORE 2005

⁴³ <http://www.ashng.ru/business/>

⁴⁴ <http://www.ashng.ru/business/plans/>

Between 2009 and 2010, “Arcticshelfneftegaz” plans to begin commercial exploitation of the oil using ice-resistant stationary platforms.

The Dolgin oil field

The Dolgin oil field was discovered by Gazprom in 2000. This field is large-scale and borders the Prirazlomnoe oil field. In 2005, Gazprom obtained the licence to utilise this area of the subsoil for the purpose of prospecting and extracting mineral resources.⁴⁵

The drilling of exploratory well number two will happen from July to October in 2007. The drilling of the 3500 meter deep well will be handled using the leased “SeaDrill 7” self-raising drilling rig. The sea depth at the point of drilling is 42 meters. An additional two wells are scheduled to be drilled in 2008. “Gazflot” (a subsidiary of Gazprom) will develop the field.⁴⁶

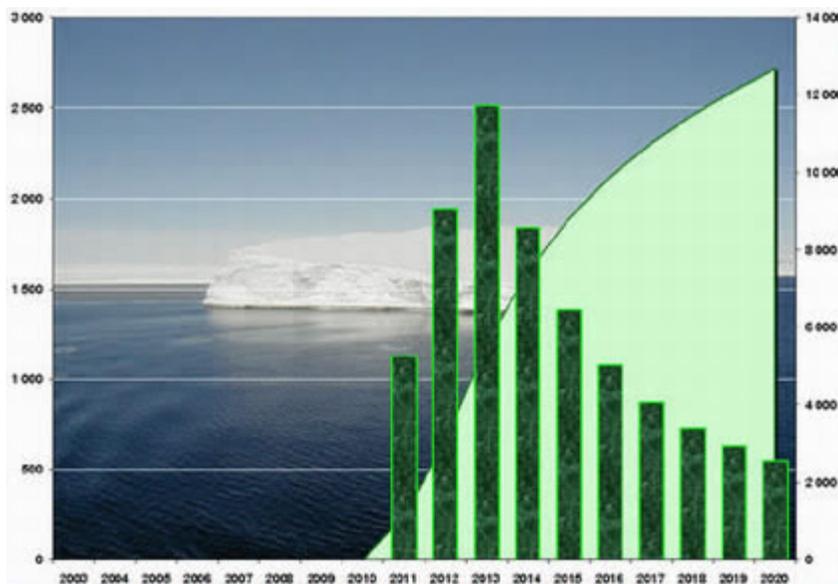


Fig. Oil output forecast up to 2020 - the Kolokolmor licensed area.

For your information:

The natural environment in the areas of the fields in the Pechora Sea are characterised by the following:⁴⁷

- a period when storms are prevalent (September - November) with waves reaching heights of 6 m;
- the freezing of floating and underwater structures;
- dense and continuous fog;
- shallow sea waters;
- frozen soil;
- brief, cold summers and prolonged winter periods with air temperatures dropping down to -48 °C;
- difficult glacial conditions over the winter period (a uniform layer of ice up to 2.0 m thick, ice hummocking and contraction by up to 3 points, the periodically changing direction of the drift in ice fields, the occurrence of stationary ice formations (grounded ice hummocks) with a keel depth of up to 20 m, ploughing through the bottoms of drifting ice formations, thick heaps of ice forming on stationary offshore structures and shores and so forth);
- significant fluctuations in sea levels (up to 5 m over a 100 year period);
- a marine Arctic climate.

1.5. Gas resources on Russia’s Euro-Arctic shelf

In sum potential resources structure of the Barents Sea, gas-forming hydrocarbons predominate (21.6 trillion cubic metres), with liquid resources (oil and condensate) accounting for 1.1 billion tonnes. On the shelf of the Pechora Sea, liquid hydrocarbons amount to 2.2 billion tonnes, gas-forming hydrocarbons - 2.7 trillion cubic metres.

For your information:

Casing-head gas - found in the oil seams as a solute in the oil (unlike free gases in the gaseous cap) which is discharged from these seams in the event of a reduction in pressure.

Petroleum gas - a natural gas accompanying the oil in the form of a gaseous cap above the oil seam or which is found in the oil in the form of a solute.

Gas condensates - a natural system of mutually soluble, gas-forming and liquid petroleum hydrocarbons having a low boiling point which are to be found in thermodynamic conditions in the earth’s subsoil in gaseous or vaporous phase states.

⁴⁵ <http://www.mnr.gov.ru/part/?act=more&id=1428&pid=11>

⁴⁶ <http://www.adm-nao.ru/?page=0000&news=713>

⁴⁷ CONCEPTION OF THE DEVELOPMENT OF THE MEDYNSKO-VARANDI Kutitchkin, the “Arcticshelfneftegaz” private company - Yuri F. Federovskiy, the “Morneft” scientific research and design institute - Yuri A. Simonov, the Central scientific research institute named after the academic A.N. Krylov. RAO/CIS OFFSHORE 2005

Five gas fields have been identified for development in the Barents Sea: the Shtokman gas condensate field (with reserves in excess of 3.6 trillion cubic metres), the Murmansk gas field, the Ledov gas condensate field, and the Severo-Kil'din and Ludlov gas fields.⁴⁸

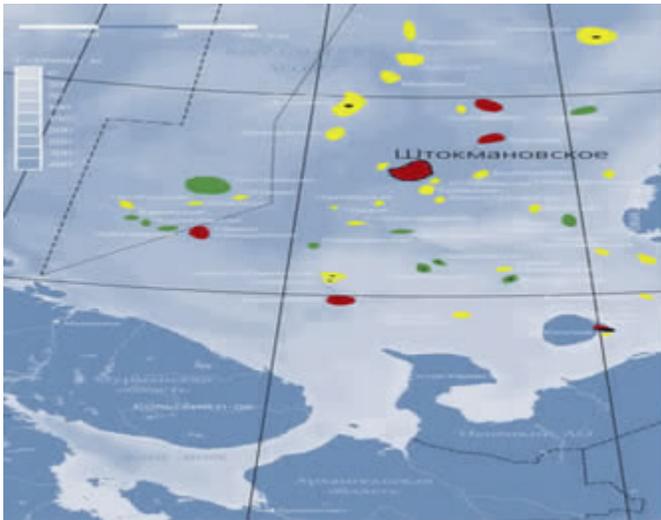


Fig. The Shtokman gas condensate field.

The Shtokman gas condensate field

The Shtokman gas condensate field is located in the central part of the Barents Sea, 650 km north-east of Murmansk, 920 km north-east of Arkhangelsk and 290 km to the west of Novaya Zemlya.⁴⁹

The hydrocarbon seams are situated at a depth of 1,900-2,300 m. It is suggested that the stable extraction of gas may be possible for 50 years, with 91% of the field's reserves concentrated in two seams. The field covers an area of 1,400 km² and the sea is 300-380 m deep.⁵⁰

The field's reserves total 3.66 trillion cubic metres of gas and 30 million tonnes of condensate. When operating at maximum productivity, the planned volumes recovered from the Shtokman gas condensate field may be anywhere from 71 - 94.6

billion cubic metres per annum depending on the development option.

Sevmorneftegaz has the license to develop the Shtokman gas condensate field.

Gazprom's planned field infrastructure facilities on Shtokman:

Offshore installations:

- a gas extraction system;
- main underwater pipelines for transporting natural gas and condensate to the shore;

On the territory of Murmansk oblast:

- a complex for manufacturing liquefied natural gas (including receiving and unloading terminals; a port; port structures and a port fleet);
- the Vidyaevo-Volkhov gas pipeline (extending 450 km over Murmansk oblast);
- a branch pipe of the gas pipeline to supply consumers in Murmansk oblast.

The basic variant for developing the infrastructure on the Shtokman gas condensate field proposes arrangement of underwater offshore recovery complex equipment.

Depending on the volume of gas supplied, provision is made for two options in terms of transporting gas beneath the Barents Sea:

- Option one: 4 gas pipeline branches from the field to the liquefied natural gas factory on the shore of Ura Bay and 2 gas pipeline branches from the field to the terminal on the shore of Nasha Bay.
- Option two: 4 gas pipeline branches from the field to the liquefied natural gas factory on the shore of Ura Bay and 4 gas pipeline branches from the field to the terminal on the shore of Nasha Bay.

For your information:

The Sevmorneftegaz private company, a subsidiary of Gazprom, is involved in the infrastructure development and exploitation of oil and gas fields on the Continental shelf of the Arctic Ocean and in adjacent mainland regions.

Sevmorneftegaz was founded in 2002 on an equal footing with Gazprom and Rosneft - the "Rosshelf" private company and the Rosneft-Purneftegaz state oil company. In December 2004, Gazprom's subsidiary bank, Gazprombank, agreed to acquire from Rosneft all of its shares in Sevmorneftegaz, a 49.95% participation in the project aimed at developing the Arctic shelf in the Barents and Pechora Seas, and also 26% of the shares in Rosshelf for USD 1.7 billion.

Here's a thought...

The amount of capital expenditure for construction of the planned system facilities, disregarding the tanker fleet, is in the region of USD 41-70 billion. Capital expenditure for facilities located in the Murmansk oblast amounts to USD 12-17 billion.

The route adopted by the marine pipeline

REGION AND THE FUTURE PROSPECTS FOR ITS DEVELOPMENT", M.D. (Arctic exploration institute)

project for developing, in the first instance, the Shtokman field involving the production and transportation by sea of liquefied gas", vol. II - Technical solutions for producing liquefied gas. Book 8. Evaluation of the effect on the environment. Section 8.1 Offshore structures. Part I, archive number 6851.101.001.13.44.02.08-1 St. Petersburg 2005.

⁵⁰ "ACTIVITIES UNDERTAKEN BY THE Sevmorneftegaz PRIVATE COMPANY IN THE DEVELOPMENT OF OIL AND GAS FIELDS ON RUSSIA'S ARCTIC SHELF", Ivan N. CHERNOV, Sevmorneftegaz private company. RAO/CIS OFFSHORE 2005

between the Shtokman gas condensate field and Vidyaevo (or Teriberka) will extend about 571.5 km, of which 571 km is on the sea bed. The sea depth in sections through which the pipeline passes is up to 374 m.

In the area of the Vidyaevo settlement (or Teriberka), construction of a transport and technological complex at the port is proposed, comprising:

- a factory for producing liquefied natural gas,
- a depot for liquefied natural gas,
- a terminal for unloading,
- port structures,
- installations for preparing the gas for transport overland, and
- a system for servicing the extraction complex.

Here's a thought...
In 5 municipal establishments in Murmansk oblast, public hearings have been held in relation to evaluating the effects on the environment of the Shtokman field infrastructure development project and the construction of the gas transport system from Shtokman to Volkhov via Murmansk oblast and Karelia.
According to data from Gazprom:
94% of the population supported the project.
44% of the population were worried about ecological issues,

The phased development of the production of liquefied natural gas makes provisions for the factory to produce 13.6 million tonnes of liquefied natural gas per annum in the first stage. As regards the extraction of natural gas amounting to 71 billion cubic metres per annum, the factory proposes producing liquefied natural gas amounting to 30-45 million tonnes per year. In 2006, it was suggested that the initial commissioning of the liquefied natural gas factory will occur in 2011.

Commissioning of the main overland gas pipeline between Vidyaevo and Volkhov, extending approximately 1,335 km depending on the field development options, was proposed for the period 2014 – 2016 by plans elaborated in 2006.⁵¹ According to authorities in the Murmansk oblast, the region will receive 4.7 billion cubic metres of gas per year following the launching of the gas pipeline, which will allow the oblast's energy complex to switch to gas in the future.⁵²

In July 2006, Sevmorneftegaz (a wholly-owned subsidiary of Gazprom) carried out drilling of exploratory well number 7 on the Shtokman gas condensate field, and confirmed an increase in gas reserves by more than 600 billion cubic metres. The sea depth at the point of drilling is 340 m. The drilling was conducted by the semi-immersed Deepsea Delta drilling rig, in cooperation with the Norwegian company Hydro.

Here's a thought...
Potential reserves from the Shtokman and Prirazlomnoe fields amount to 3.66 trillion cubic metres of gas and 250 million tonnes of oil.

The work was carried out on the orders of Sevmorneftegaz which owns the licenses in relation to the exploration, geological study and extraction of gas and gas condensate on the Shtokman field. The general contractor is the Gazflot limited liability company (a wholly-owned subsidiary of Gazprom).⁵³

Here's a thought...
We do not believe there will be any development of the Shtokman field in the near future. Russia is lacking experience and technology in the offshore industry. There are dozen of other offshore fields more accessible, and cheaper to develop. Furthermore, in Russia there is a general lack in willpower to make long-term investments. Why would Russia begin with the most expensive and difficult project, when their offshore oil and gas development is only in the making? It would be like eating the cake from the middle - Kristin Jørgensen, Bellona Foundation.

Foreign company participation in the development of the Shtokman field

Thus far, Russia has not had any offshore experience in extracting gas under such difficult environmental and climatic conditions. Implementation of the project will require application of advanced technologies with regard to underwater extraction and the transport of gas, as well as a huge amount of capital investment.

The project for developing the Shtokman gas condensate field suggests implementation on the basis of the production sharing agreement. Such an agreement allows the rights to extract and sell gas to be transferred to an international consortium of enterprises, 51% of which would be owned by Gazprom.⁵⁴

In September 2005, Gazprom drew up a list of possible participants in the consortium for developing the

⁵¹ The Giprospeftgaz public company - "Basis for investment in the integrated development of the Shtokman gas condensate field".

⁵² <http://www.murman.ru/themes/oil-22092006.shtml> 22.09.2006

⁵³ <http://www.lenta.ru/news2/2006/07/25/gazprom/>

⁵⁴ The challenge facing Shtokman, Pavel Prokhorov: http://www.expert.ru/world_business/2006/06/vyzov_Shtokmana/

Shtokman field. This shortlist included five foreign companies: the US companies *ConocoPhillips* and *Chevron Texaco*, the French company *Total*, and the Norwegian companies, *Statoil* and *Hydro*. Gazprom's chief executive declared that the final composition of the consortium of developers for the Shtokman field would include two or three companies. However, at the beginning of October 2006, Gazprom's chief executive, Aleksey Miller, declared that Gazprom had decided to develop the Shtokman field project independently, and the participation of foreign companies was reduced to the role of subcontractors.⁵⁵

On July 13 2007 Gazprom chose the French company Total as its main partner to develop the Shtokman gas field. The deal was announced one day after French President Nicolas Sarkozy and Russia's Vladimir Putin spoke on the phone about energy cooperation and other issues.

Here's a thought...

"Statoil is rejoicing, calling it the day of its entrance into the project a happy day for the Braent's Sea," said Bellona President Frederic Hauge. - It's a sad day for the Barents Sea. The Arctic and Barents Sea ecosystem is experiencing a colossal load, which will only increase with the development of the Shtokman field."⁵⁶

Russia's state-controlled natural gas giant Gazprom announced on October 25 2007 the second partner of the project; StatoilHydro. Again, Vladimir Putin himself announced the deal between Gazprom and StatoilHydro by phone to the Norwegian Prime Minister, Mr. Jens Stoltenberg. During this conversation the Russian President Vladimir Putin his hope that Russian-Norwegian cooperation through the large-scale project would provide a

boost for bilateral ties in other areas.

StatoilHydro and Total will not own any of the gas resource, but they will have a share in the Shtokman Development Company that will finance, own and build the infrastructure of the Shtokman field. The plans will include construction of wells, infrastructure, LNG-plant and pipelines. In the Shtokman development company Gazprom has a 51 % interest, and Total and StatoilHydro will have 25% and 24%, respectively. The implementation of the Shtokman project is dependant upon the final investment decision which will be taken in 2009. At that time it will be decided if, and how, the field will be developed. Total and StatoilHydro are expected to pick up the bill. According to Samuel Goldsmith in the Russian consultant group 2K Audit Gazprom will not invest in the Shtokman project prior to 2009⁵⁷.

From the outset of discussions relating to the Shtokman project, there was an intention to transport large-scale supplies of liquefied natural gas to the North American market, particularly to the USA. However, these plans changed in the autumn of 2006. In October that year, Gazprom decided to prioritise the European market in supplying pipeline gas from the Shtokman field as compared with liquefied natural gas. The Shtokman field will, according to Gazprom, become the resource centre for Russian gas exports to Europe through the existing Nord Stream submarine gas pipeline (the North Europe Gas Pipeline).⁵⁹ The supply of liquefied natural gas to the USA is proposed as part of the progressive development of the Shtokman field.⁶⁰

Here's a thought...

"There is no doubt this is a political deal between Vladimir Putin and Jens Stoltenberg. The bilateralization of the relationship between Norway and Russia can create problems for the Norwegian government and StatoilHydro. StatoilHydro is very small compared to Gazprom. There is a danger the Russians may trample on the Norwegians, says Jakub M.Godzmirski, senior researcher in the Norwegian Institute of International Affairs (NUPI) to Teknisk Ukeblad."⁵⁸

For further reading about transportation we recommend chapter two of this report.

Future production sharing agreement:

Russia is inclined towards rejecting the production sharing agreement plan. At a meeting of the Security Council of the Russian Federation in December 2006, it was declared, in particular, that the practice of concluding production sharing agreements for offshore fields is not in keeping with Russian national interests.⁶¹

⁵⁵ GAS FROM THE SHTOKMAN FIELD WILL BE SUPPLIED TO THE EUROPEAN MARKET BY PIPELINE, report on Gazprom's website, 09.10.2006, http://www.gazprom.ru/news/2006/10/091755_21270.shtml.

⁵⁶ http://www.bellona.org/articles/stateoil_comment

⁵⁷ <http://www.tu.no/offshore/article121290.ece>

⁵⁸ <http://www.tu.no/offshore/article118680.ece>

⁵⁹ See above.

⁶⁰ Interview given by the President of the Russian Federation, V.V. Putin, 07.12.2006, <http://www.kremlin.ru/text/appears/2006/12/115090.shtml>.

⁶¹ Grib, N., "Vot kompaniya kakaya" - "Kommersant", 11.12.2006.

This is linked to the fact that investors participating in such agreements own a part of the raw materials recovered. The argument behind the decision in the Security Council is that, since raw materials prices may increase, an agreement of this nature may become unprofitable for the State.

Gas resources in the Kara Sea



Fields:

gas and gas condensate

oil and gas

offshore (marine)

revealed local structures

-100- Isobaths

Fig. Fields in the Kara Sea.

Natural gas has become a serious foundation for the Russia power industry, in connection with which the preparation of the gas industry’s raw materials base has become one of the main components of economic policy. Gas export and “energy security” is also a main component in Russian foreign policy.

All the gas condensate fields surveyed on the Yamal Peninsula and the adjoining shelf of the southern part of the Kara Sea belong to the category of large-scale areas of oil and gas accumulations.

On the shelf of the Kara Sea, seven large-scale structural folds have been established. These are connected with the formation of the Rusanov and Leningrad gas fields which have already been opened, as well as the Nyarmey and Skuratov structures arranged 25 km off the coast of the Yamal Peninsula which are potential exploration sites. They are situated between the Malygin field (on the Yamal Peninsula) and the Rusanov and Leningrad fields (on the shelf) where up to 30 gas-bearing sites have been located.

According to several estimates and calculations of the category C3 reserves, the seams of several sites may each contain up to 2.5 trillion cubic metres of gas.

According to data obtained from a seismic survey, areas have been singled out 20 km to the west of the Kruzenshtern gas condensate field, opened on the west coast of the Yamal Peninsula, and within the limits of the Sharapova Koshka Islands and the surrounding shallow water shelf, which form the local structure in Sharapova. If preliminary data is confirmed by a detailed seismic survey, the opening of fields with reserves of up to 1 trillion cubic metres is considered possible.

The shelf of the southern part of the Kara Sea adjacent to the western coast of the Yamal Peninsula is considered a large-scale hydrocarbon reserve. This is despite the fact that the structure of the shelf in the oil and gas-bearing region of the Kara Sea has not been studied in detail. The contours of the first wells opened in the 14 gas sections on the Rusanov and Leningrad fields where total category C2 gas reserves are estimated at 9 trillion cubic metres remain uncertain.

The western sea-based half of the multilayer (11 seams) Kruzenshtern gas field, the land-based reserves of which were affirmed by the State Committee on Mineral Resource Reserves as totalling 1,231 billion cubic metres, is also not much explored on the coastal shelf of the Yamal Peninsula.

At the large-scale structures of Nyarmey, Skuratov and Severo-Kharasav on the west coast of the Yamal Peninsula, which were revealed by a seismic survey, potential gas reserves total 4 trillion cubic metres.

The strategic programme for developing gas reserves in the south of the Kara shelf drawn up by the Gazprom State concern makes provision for the following phases:

- conducting a detailed field appraisal in preparation for development of the offshore part of the Kruzenshtern and Kharasav fields with a growth in reserves of 3 trillion cubic metres of gas;
- prospecting the Nyarmey, Skuratov, Morsk, Severo-Kharasav and Sharapov structures, studying the gas and oil areas which have been revealed, and an increase in C1+C2 reserves of not less than 7 trillion cubic metres of gas;
- conducting detailed field appraisals of the established Rusanov and Leningrad fields and an increase in C1+C2 reserves of 9 trillion cubic metres of gas.

Thus, the explored gas reserves in the southern part of the Kara Sea, together with the explored reserves contained in the Bovanenkov field, total 19 trillion cubic metres of gas. Such large reserves will, according to Gazprom, motivate companies in the oil and gas sector to establish a gas production centre in the Kara Sea which will allow an overall increase in gas extraction in the country to 800+ billion cubic metres per annum by 2025.⁶²

According to data compiled by the All-Russian scientific research institute concerned with natural gases and gas technologies, the total potential resources in the waters of the Bays of Obstk and Tazov are estimated at 7.4 trillion cubic metres of gas. The central portion of the Bays of Obstk and Tazov has been studied in the greatest detail. An estimate of the localised resources and reserves in this section of the waters is 2.4 trillion cubic metres of gas. As of today, industrial category C1 gas reserves added by Gazprom in the waters of the Bays of Obstk and Tazov are estimated at 819 billion cubic metres.

The average annual increase in gas reserves over the period when work was carried out in the bays between 2000 and 2004 amounted to more than 200 billion cubic metres. Today, as a result of geological exploration work, 4 gas fields - Kamennom Sea, Severo-Kamennom, Obstk and Chugoryakhin - have been confirmed. The Severo-Kamennom and Kamennom Sea fields have been prepared for development. In order for Gazprom to carry out further exploration work in the waters of the bays, applications to obtain licenses to undertake geological study within the South Obstk, Aderpayutin, North Obstk, Tamba-Obstk and Sabet-Obstk sections have been drawn up and forwarded to the Russian Ministry of Natural Resources.

Here's a thought...

The oil and gas-bearing region of West Siberia has prospective resources totalling 56 trillion cubic metres of standard fuel. There is a high probability of prospecting not less than 15 trillion cubic metres of gas here by 2015. At the same time, creation on the basis of offshore gas fields arranged not far from the western coast of the Yamal Peninsula in the gas production centre of the Kara Sea could ensure the extraction of not less than 300 billion cubic metres of gas per year in 2015.

For your information:

The Kara Sea region

This region poses a challenge in terms of hydrometeorological and glacial conditions. The water depth exceeds 60 - 80 metres where the main part of the field is located. On the whole, the fields are largely gas-bearing and are situated 100-150 km from the shore.

The region around the Bays of Obstk and Tazov

This region differs from the preceding regions in terms of the extreme shallow water, the difficult ice conditions and the hydrological conditions which involve 50% salt water and 50% fresh water. The gas fields are located about 40 km from the coast.

⁶²

Realisation of the development of gas production on the resource base of identified and predicted fields in the Bays of Obok and Tazov is planned jointly with fields located on the adjacent land. Equatorial and coastal fields are regarded as a single resource base for developing the gas production complex in the region. Gazprom considers the fields in the waters of the Bays of Obok and Tazov to be facilities for immediate development in this region. The fact that fields have been revealed allows licenses to be obtained for exploration and extraction without holding auctions.

According to data compiled by the All-Russian Scientific Research Institute for Natural Gases and Gas Technologies, total gas production in fields in the first stage of development is estimated at approximately 30 billion cubic metres of gas per annum. Taking this figure as a basis, it is estimated that gas could be produced on a continual basis for a period of 15 years. The development of hydrocarbon resources on the shelf of the Bays of Obok and Tazov will be realised taking into account the proximity of the Yamburg gas production complex. The proposed scenarios for developing facilities envisages the construction of installations for integrated gas treatment on which the complete, field-based preparation of well production is carried out, after which the gas is transported on to the gas compressor station in Yamburg for supply to the existing system of main gas pipelines.⁶³

Oil and gas reserves in transit zones

In order to achieve an increase in offshore oil and gas reserves on the Arctic shelf, the Russian government instructed the Ministry of Natural Resources and the Federal Agency for subsoil regulation to develop new prospective fields on the European Arctic Continental Shelf.

Shelf transit zones (shallow areas of water with depths below 20 m and their low-lying shores) are considered significant for accelerated study. An analysis of their long-term prospects in terms of oil and gas-bearing capability was initiated by the “Sevmorgeo” State scientific production enterprise in 1999 when an expert appraisal of the oil and gas potential of the transit zones of all of Russia’s seas was conducted together with the All-Union Scientific Research Institute for Geological Exploration.

Here’s a thought...

In many large State companies, new technologies, by means of which oil may be pumped out from fractures and folds in old seams, also progress slowly. To rehabilitate the demolished infrastructure, and for the purpose of technological innovation, companies in Libya, Venezuela and Russia urgently require foreign assistance. In Russia private companies usually recover up to 50% of the oil contained in the well, as far as State companies are concerned, this figure is only 20%.

The unexplored oil and gas resources in the transit zone make up around 28% of the unexplored resources in the Pechora Sea. The ultimate potential resources in the transit zone have been determined as 3.7/1.6 billion tonnes of oil equivalent, of which 1.5/0.7 billion tonnes of oil equivalent is to be found at a sea depth of less than 10 m, and 2.1/0.9 billion tonnes of oil equivalent at a depth of 10 m. The proportion of oil in this predicted volume is estimated at 80%. Oil deposits in this transit zone, apart from the Varandey-Adz’vin zone, where they have already been revealed, are forecast to the east of Khoreyver

hollow and at the Malozemel’-Kolguev monoclinial fold.

To the west of the Khoreyver hollow, as well as in the Pechoro-Kol’vin avlakogene, oil and gas condensate deposits are anticipated, while in the Korotaikhin hollow, the deposits are primarily gas. Not all the ultimate potential oil and gas resources in areas with depths of less than 10 m have been explored and belong to category D2, while amongst the resources from deeper sections of water (10 m), unexplored resources total 57% and belong to category C3+D1.⁶⁴

1.6 Development of offshore oil and gas reserves on the Arctic shelf

The offshore oil and gas resources of the Arctic shelf is situated in a geographical area characterized by a rough climate, difficult ice conditions, and long distances from the existing infrastructure. The lack technology and offshore experience, together with the difficult climatic conditions makes it a major challenge for the Russian

⁶³ RESULTS OF THE WORK CONDUCTED BY GAZPROM AND PREPARATION FOR DEVELOPMENT OF GAS RESOURCES IN THE WATERS OF THE BAYS OF OBSK AND TAZOV IN THE KARA SEA AND THE PROSPECTS FOR FIELD DEVELOPMENT, Boris A. Nikitin, Vladimir S. Vovk, the gazprom public company, Ya. MANDEL’, Valentin A. KHOLODILOV, the “Gazflot” limited liability company. RAO/CIS OFFSHORE 2005

⁶⁴ STUDY OF THE TRANSIT ZONE - THE STRATEGIC TREND OF GEOLOGICAL EXPLORATION WORK ON THE RUSSIAN SHELF Gennadiy I. IVANOV, Mark L. VERBA, Yuri I. MATVEEV, Sergey A. NECHKHAEV, the “Sevmorgeo” State scientific production enterprise Yuri N. GRIGORENKO, All-Union scientific research and geological exploration institute. RAO/CIS OFFSHORE 2005

government to develop these fields, they consider so strategic important.

It is still the oil and gas complex who decides how to develop the offshore fields, and from where to find the astronomical investments required to build the infrastructure needed. Some of the different plans for infrastructure when developing the offshore fields today are as follows:

- To develop the fields by using both stationary and mobile ice resistant platforms and sub sea solutions for exploitation.
 - To use floating nuclear power plants as energy supply for the offshore platforms in the Russian Arctic. One prototype is being constructed and 6 -7 more are planned at the shipyard in Severodvinsk in Archangelsk. The Federal Agency on Nuclear Energy (Rosatom) confirms that considers the use of two floating nuclear power stations for the development of the Shtokman field and another three stations for fields along the Yamal peninsula. The company wants the power stations to fuel both production and transport operations.⁶⁵
- Rosbalt.ru reports that Gazprom believes that each nuclear plant will allow saving up to 150 million cubic meters of gas per year, this will make 40 million dollars extra in gas exports.
- To use domestic military technology to develop offshore fields and to construct ice-resistant platforms.

For your information

According to "Rosgidromet", the Arctic climate is becoming milder. There will be more storms and big icebergs in the Barents Sea. There will be a possibility to meet icebergs the size of Jamaica in the Barents Sea. In Russia there is neither experience nor technology to deal with this⁶⁶.

1.7. Subsoil regulation in Russia⁶⁷

Federal Law No. 2395-1 dated 21.02.1992 "regarding subsoil" is the fundamental Russian normative and legislative act in the sphere of subsoil use. Subsoil use in the Russian Federation is subject to fees.

The law recognises the importance of subsoil regulation for people and for the economy and its significant influence on the environment.

Utilising the Continental shelf's mineral resources

Granting utilisation of the Continental shelf's mineral resources and those of the Russian Federation's exclusive maritime economic zone are elaborated in Federal Law No. 187 dated 30.11.1995 "regarding the Continental shelf of the Russian Federation".

The specific character of the Continental shelf's legal regime provides a foundation for consolidating provisions in a special law that grants preference to native users who utilise the resources of Russian industry as much as possible and restricts participation of foreign users in competitions to explore, survey and exploit mineral resources in the interests of guaranteeing security and development of industry and power engineering in the Russian Federation.

In 2007 the Russian government is working with amendments to the Russian tax law regarding tax regulations in the Mineral extraction tax. It is suggested to give tax exempt to offshore fields in the Russian Arctic⁶⁸.

Within the confines of the Continental shelf and the exclusive economic zone of the Russian Federation beyond the external boundary of its territorial waters (the twelve mile zone), licensing is carried out by the Ministry of Natural Resources following a decision taken by the Russian Government. This is according to existing international offshore law standards.

Licence to use subsoil

Legal permission to use subsoil is granted by special State authorisation in the form of a license.

⁶⁵ <http://www.rosbalt.ru/news/25520.html>

⁶⁶ Dmitri Zhdannikov/Reuters, 27 April 2007, Moscow

⁶⁷ "Utilising the Earth's interior: a theoretical and legal analysis", V.N. Kokin. Moscow, 2005

⁶⁸ The Shelf is being divided between state companies/ Gazprom and Rosneft is granted tax exempts.

<http://www.kommersant.ru/doc.html?path=/daily/2007/095m/14939923.htm>

Legalisation, State registration and the issuing of licenses relating to the use of certain subsoil areas is managed by the Federal Agency for Subsoil Regulation or its regional institution. The license portrays a coat of arms of the Russian Federation, and contains supplements in the form of text and graphics which delineate the basic conditions for using the subsoil.

The license gives its owner the right to use subsoil areas within specified boundaries for the purpose stated in the license during a specified period, provided the owner observes conditions agreed upon beforehand.

The license certifies the right to carry out work on all forms of subsoil regulation, including:

- the geological study of the subsoil;
- the development of mineral resource deposits;
- the utilisation of waste materials from mining production and the associated reprocessing activities;
- the utilisation of the subsoil for purposes not connected with the extraction of mineral resources;
- the formation of geological sites which are afforded special protection;
- the harvesting of mineralogical, palaeontological and other geological sample materials.

Combined licenses may also be granted which permit utilising the subsoil in several ways. The license is issued once preliminary agreement is reached on the part of the body responsible for managing land resources, or the landowners, to allocate the corresponding plot of land for the purpose of subsoil regulation.

The license for subsoil regulation consolidates the conditions and form of contractual relations pertaining to subsoil regulation.

Timeframes for utilising sections of the subsoil

The State lays down fixed timeframes for subsoil regulation depending on the type of use. In Russia, sections of the subsoil are granted for use either for a fixed period, or indefinitely. The following types of fixed-term licences are issued:

- geological study - for a period of up to 5 years; extraction of mineral resources, estimated starting from the technical and economic basis for developing mineral resource deposits which guarantees efficient use and protection of the subsoil
- extraction of subterranean waters - for a period of up to 25 years;
- extraction of mineral resources on a short-term basis by granting a short-term entitlement to utilise sections of subsoil to a temporary operator. This, in the event of the license owner's right to use these aforementioned sections stopping ahead of schedule, and the inexpediency or impossibility of suspending the extraction of mineral resources - for a period of up to 1 year.

Licenses may be issued for an unlimited period for the following activities:

- construction and exploitation of underground structures not connected with the extraction of mineral resources;
- construction and exploitation of underground structures connected with the burial of waste products;
- construction and exploitation of oil and gas holders;
- formation of geological sites which are afforded special protection;
- other objectives.

Comments by a legal expert:

The formation of geological sites which are afforded special protection: this form of subsoil management is realised taking into account the provisions of Federal Law No. 33 dated 14.03.1995 "regarding areas of nature which are afforded special protection". As applied to the Continental shelf of the Russian Federation, the license granting the right to use the subsoil in such territories directly prohibits the inclusion of sanctuaries, game reserves, prohibited areas and other territories on the Continental shelf afforded special protection, which are important as regards the preservation, reproduction and migration of important animal and plant species.

For your information:

The ministry of Natural Resources suggests strengthening the possibility to obtain combined licenses for geological studies, exploration and drilling on the shelf. The ministry also proposes to extend the timeframe for geological studies from 5 to 8 years, with the possibility of further prolonging⁶⁹.

The timeframe for utilising a section of the subsoil may be extended on the initiative of the subsoil user

⁶⁹ *Barentsobserver.com/February 15th 2007*

once conditions stipulated in the license are fulfilled, provided there is a need to complete development of the mineral resource deposits or carry out liquidation measures. The timeframes for utilising sections of the subsoil are calculated from the time the license is registered with the State.

Bids and auctions for the right to utilise sections of the subsoil

Until recently on the Arctic shelf, there was a system of bids and auctions for obtaining licenses on the subsoil. The Federal organ for State Governance of the Subsoil (ROSNEDRA) is responsible for regulating this process in Russia. The Russian Government decides utilisation of each section of subsoil, or grouping of subsoil sections in internal sea waters, territorial waters and the Continental shelf of the Russian Federation. The bid and auction committees also include representatives of the executive body of the corresponding site within the Russian Federation, except for cases concerning the granting of rights to utilise subsoil sections in internal or territorial waters and on the Continental shelf.

In January 2007 it was officially announced by president Vladimir Putin that the in the Russian Arctic all licenses will be given to the state companies Gazprom and Rosneft. It was also decided that contracts would be subject to competition and not through auctions. How this will be in practice will become clear when the amendments to the Russian laws “Law on the Continental Shelf” and “Law on the use of the subsoil”⁷⁰

Procedures for conducting competitions⁷¹

Here’s a thought

Now the work of how to divide the shelf between the companies (Rosneft and Gazprom), and to decide which changes in the law this decision pushes forward. It is important to reflect this in the law. – Rinat Gizatulin, Representative of the Ministry of Natural Resources⁷²

Information regarding impending competitions must be published in All-Russian and corresponding regional mass media no later than 90 days prior to the date when they are to be carried out. The official basic criteria for determine the successful bidder when holding competitions for the right to use sections of subsoil are as follows:

- the scientific and technical level of geological study and subsoil section utilisation programmes;
- the complete nature of mineral resource extraction;
- the contribution made to the territory’s social and economic development;
- the timeframes for implementing the corresponding programmes;
- the efficiency of measures for protecting the subsoil and the surrounding environment;
- the consideration for national security interests in the Russian Federation.

The results of the competition, or auction, shall be corroborated within 30 days of when they are held and must be published in All-Russian and regional mass media. If the competition advertised does not take place in connection with receipt of the application from just one participant, the license to use the section of subsoil may be issued to this participant under the conditions of the competition advertised.

LIST OF EXISTING LICENSES				
Licensed area	License owner	License	Date of registration (re-registration)	Period of validity
Shtokman	The Sevmorneftegaz	SHBTS 11322 NE	28.11.2002	15.03.2018
Prirazlomnoe	The Sevmorneftegaz	SHPCH 11323 NE	28.11.2002	15.03.2018
Kolokolmor	The Arcticshelfneftegaz	SHBM 11358 NR	26.12.2002	24.09.2025

⁷⁰ The shelf is divided between the state companies. // Gazprom and Rosneft gets tax exempts.

<http://www.kommersant.ru/doc.html?path=/daily/2007/095m/14939923.htm>

⁷¹ «Subsoil regulation : theoretical – juridical analyze », V.N. Kokin. Moskva, 2005.

⁷² [kommersant.ru/doc.html?path=/daily/2007/095m/14939](http://www.kommersant.ru/doc.html?path=/daily/2007/095m/14939)

Pomor	The Arcticshelfneftegaz	SHBM 11357 NR	26.12.2002	24.09.2025
Medynsko-Varandey	The Arcticshelfneftegaz	SHBM 11356 NR	26.12.2002	24.09.2025
Kola - 3	The Severneftegaz	SHBM 11649 NP	08.08.2003	28.02.2008
Kola - 2	The Severneftegaz	SHBM 11648 NP	08.08.2003	28.02.2008
Kola - 1	The Severneftegaz	SHBM 11647 NP	08.08.2003	28.02.2008
Tsentrал'no-Kola	The Sintezneftegaz	SHBM 12527 NP	05.07.2004	16.06.2009
Sryedne-Kola	The Sintezneftegaz	SHBM 12528 NP	05.07.2004	16.06.2009
Zapadno-Kola	The Sintezneftegaz	SHBM 12529 NP	05.07.2004	16.06.2009
Pakhtusov	The Sintezneftegaz	SHBM 12644 NP	01.09.2004	30.08.2009
Admiralтей	The Sintezneftegaz	SHBM 12645 NP	01.09.2004	30.08.2009
Chugoryakhin	The gazprom public company	SHKM 11230 NP	30.05.2002	01.10.2006
Obsk	The gazprom public company	SHKM 11229 NP	30.05.2002	01.10.2006
Kamennom	The gazprom public company	SHKM 10902 NP	06.07.2000	31.12.2008
Dolgin	The gazprom public company	SHPM 13443 NE	30.12.2005	31.12.2025
North Barents Basin, eastern edge GK No. 05/03/70-152	The MAGE [Marine Arctic Geological Expedition] public company	SHBM 13407 NP	13.12.2005	31.12.2007
South Barents Basin, Kola-Kaninsk GK No. 03/07/332-3	The MAGE [Marine Arctic Geological Expedition] public company	SHBM 13408 NP	13.12.2005	31.12.2006
Admiralтей swell section GK No. 01/03/331-2	The MAGE [Marine Arctic Geological Expedition]	SHBM 13409 NP	13.12.2005	31.03.2006
Sections of the Kara and Barents Seas (R-41) GK No. 03/03/12-17	The "MAGE [Marine Arctic Geological Expedition]	SHKM 13410 NP	13.12.2005	31.12.2008
Western part of the Pechora Sea GK No 07/01/70-69	The Yuzhmoregeologiya State scientific centre	SHPM 13353 NP	15.11.2005	31.12.2007

1.8 Companies operating on the Arctic shelf

As stated before, in January 2007 it was announced that the state companies Rosneft and Gazprom will develop all fields on the Arctic shelf and on the Far-Eastern shelf in Russia. These fields have been granted tax exempt, and possible foreign investments will be looked at individually.⁷³

Here's an opinion

Some political analysts in Russia believe that the process of sharing the Russian Arctic shelf will lead to conflict between the two state owned companies Gazprom and Rosneft⁷⁴.

ОАО Rosneft Oil Company is a Russian integrated oil company. Rosneft conducts oil and gas exploration and production activities on Sakhalin island, in Siberia, in the Timan-Pechora province, and in southern Russia, including Chechnya. It also owns and operates two refineries. Its plant in Tuapse, on the Black Sea, focuses on refining high-gravity oil from western Siberia. The other plant is located in Komsomolsk-on-

⁷³ Шельф поделят госкомпании // «Газпром» и «Роснефть» получают налоговые льготы
<http://www.kommersant.ru/doc.html?path=/daily/2007/095m/14939923.htm>

⁷⁴ RBK Daily Ljudmila Podobedova. 2007. 05.07

Amur is the easternmost oil refinery in Russia. Rosneft operates shipping companies, pipeline companies and marketing companies.

Although the company is an open joint stock company, according to its website, it seems to be completely owned by the Russian Federation, as represented by the Federal Property Management Agency. In 2004 the company agreed to merge with Gazprom. The merger did not come through because of disagreements between the leadership of the two companies

On December 22, 2004, Rosneft bought the Baikal Finance Group, which three days earlier had won a government sale of Yuganskneftegaz (Yugansk), the main production subsidiary of the beleaguered oil company Yukos.

Market value of Rosneft was valued at \$83.908 billion. on December 29th, 2006⁷⁵

Gazprom (Russian: ОАО Газпром, sometimes transcribed as Gasprom) is the largest Russian company and the biggest extractor of natural gas in the world. It accounts for about 93% of Russian natural gas production and with reserves of 28,800 km³, it controls 16% of the world's gas reserves. After acquisition of the oil company Sibneft, Gazprom, with 119 billion barrels of reserves, ranks behind only Saudi Arabia, with 263 billion barrels, and Iran, with 133 billion barrels, as the world's biggest owner of oil and oil equivalent in natural gas.

According to Gazprom's official website Gazprom is the sole gas supplier to Bosnia-Herzegovina, Estonia, Finland, Macedonia, Latvia, Lithuania, Moldova and Slovakia, and provided 97 percent of Bulgaria's gas, 89 percent of Hungary's, 86 percent of Poland's, nearly three-quarters of the Czech Republic's, 67 percent of Turkey's, 65 percent of Austria's, about 40 percent of Romania's 36 percent of Germany's, 27 percent of Italy's, and 25 percent of France's. The European Union gets about 25% of its gas supplies from this company.

Apart from its gas reserves and the world's longest pipeline network with 150,000 km, it also controls assets in banking, insurance, media, construction and agriculture. See appendix

With US\$ 270 billion of market capitalization (as of May 2006), Gazprom is the world's third largest corporation following this measure.⁷⁶

The company Sevmorneftegaz, a subsidiary of Gazprom, is an operator involved in infrastructure development and exploitation of oil and gas fields on the Continental shelf of the Arctic Ocean and in adjacent mainland regions. Sevmorneftegaz owns the licenses to develop the Prirazlomnoe oil field in the Pechora Sea and the Shtokman gas condensate field in the Barents Sea.⁷⁷

The company **Arcticshelfneftegaz**, established by the Federal State unitary enterprise Arcticmorneftegazrazvedka and the state company Promyshlenniye Investitsy in January 2002. The main purpose behind creating the private company Arcticshelfneftegaz is to search for, survey and drill mineral resources in the seabed of the Barents Sea. Arcticshelfneftegaz carries out oil and gas prospecting on the shelf of the Barents Sea. It owns licenses to open up three oil and gas sites by 2025: Medynsko-Varandey, Pomor and Kolokolmor.

The company **Sintezneftegaz**, was established in 2001. In accordance with the Law "regarding subsoil", it possesses licenses giving it the right to undertake geological studies of the subsoil at five sites on the Barents Sea shelf: Zapadno-Kola, Tsentral'no-Kola, Sryedne-Kola, as well as Admiraltey and Pakhtusov. At present, in accordance with agreements entered into with specialist companies (the Federal State unitary enterprise Arcticmorneftegazrazvedka, the Sevmorneftegeofizika state company and the "AMIGE" [Arctic Marine Engineering Geological Expeditions] state company), scientific research, engineering / geological and seismic surveying work is being conducted on licensed fields.⁷⁸ In November 2006 the Federal Agency for subsoil regulation, Rosnedr, withdrew two licenses of "Sintezneftegaz". The licenses were to the fields Pakhtusov and Amirality in the Barents Sea. In February 2007 a Moscow court found the withdrawal invalid. However, according to RBC Daily, Rosnedr will appeal the court decision. The Rosnedr representative declared that the Sintez group under no circumstances would be able to keep the licence on the two fields (!)

The **MAGE** [Marine Arctic Geological Expedition] state company was founded on 17 November 1972. The aim and objective of this company's activities is marine geological and geophysical exploration of Arctic

⁷⁵ <http://en.wikipedia.org/wiki/Rosneft>

⁷⁶ <http://en.wikipedia.org/wiki/Gazprom>

⁷⁷ "ACTIVITIES UNDERTAKEN BY THE Sevmorneftegaz PRIVATE COMPANY IN THE DEVELOPMENT OF OIL AND GAS FIELDS ON RUSSIA'S ARCTIC SHELF", Ivan N. CHERNOV, Sevmorneftegaz, private company

⁷⁸ <http://www.regnum.ru/news/473325.html>

Sea shelves and the Pacific Ocean, the geological mapping of the shelf of the Russian Federation, geo-ecological investigations and ecological monitoring.⁷⁹

The **YUZHMOREGEOLOGIYA** State Scientific Centre is under the jurisdiction of the Federal Agency for Subsoil Regulation of the Ministry of Natural Resources. The centre conducts geological activity that ensures federal tasks associated with prospecting and development of mineral resources on the Continental shelf, internal waters and international waters of the Pacific Ocean.⁸⁰ This centre possesses licenses allowing it to study the western part of the Pechora Sea which are valid until end 2007.

Here's a thought...
 "When drilling wells, the marine environment is polluted by a variety of waste materials. According to data provided by experts, depending on the extraction technologies applied and the sea depth, each well may discharge up to 120 tonnes of petroleum products, 150-400 tonnes of drilling sludge and 200-1000 tonnes of other waste products into the sea", says Shamil' Movsumov, Presidential adviser of the International Ecoenergy Academy (Baku) and a member of the International Socio-ecological Union.

Areas included in the programme of licensing tenders for the shelf of the Russian Federation for the period up to 2010 (State strategy, 2003):⁸¹

Area name	Tender	Year of realisation	Area (in thousands of square kilometres)	Total Potential Resources (millions of tonnes of extracted standard fuel)
Yuzhno-Russkiy	Barents-2	2006	9.1	300
Zapadno-Matveevskiy	Barents-2	2006	2.6	180-200
Yuzhno-Prinovozemelskiy	Barents-2	2006	3.4	70-80
Mezhdusharskiy Vostochniy	Barents-2	2006	6.3	90-100
Russkiy	Barents-3	2006	2.7	107-115
Severo-Pomorskiy-1	Barents-3	2006	2.5	40-50
Severo-Pomorskiy-2	Barents-3	2006	2.8	37-42
Korginskiy	Barents-3	2006	10.1	60-70
Murmanskiy	Barents-3	2006	4.4	120
Papaninskiy	Barents-4	2007	2.1	50-60
Mezhdusharskiy	Barents	2007	2.0	50-60
Zapadno-Mityushikhinskiy	Barents-4	2007	6.5	170-180
Dmitrievskiy	Barents-4	2007	6.6	200-210
Mityushikhinskiy	Barents-5	2008	6.1	190-200
Krestoviy	Barents-5	2008	8.6	170-180
Ledoviy	Barents-6	2009	23.6	430
Ludlovskiy	Barents-6	2009	12.2	210
Kil'dinskiy	Barents-7	2010	35.6	120
Demidovskiy	Barents-7	2010	18.2	800

⁷⁹ http://www.arcticshelf.ru/Conf2004/Rus/4/files/files/index.php?option=com_content&task=view&id=20&Itemid=31&lang=ru

⁸⁰ <http://www.ymg.ru/>

⁸¹ "The state of the mineral raw materials base of Russia's Arctic shelf and the future prospects for its development", Suprunenko O.I., Kaminsky V.D. (All-Russian scientific research institute concerned with geology and mineral resources in the Pacific Ocean named after I.S. Gramberg) - materials from the conference entitled "National marine policy and economic activities in the Arctic", Murmansk, 1-2 June 2006.

Fersman	Barents-7	2010	16.8	950
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We refer to Appendix 2 for the programme of measures concerned with utilising the subsoil in the Barents and Kara Seas over the period 2011 - 2020.⁸²

Conclusions

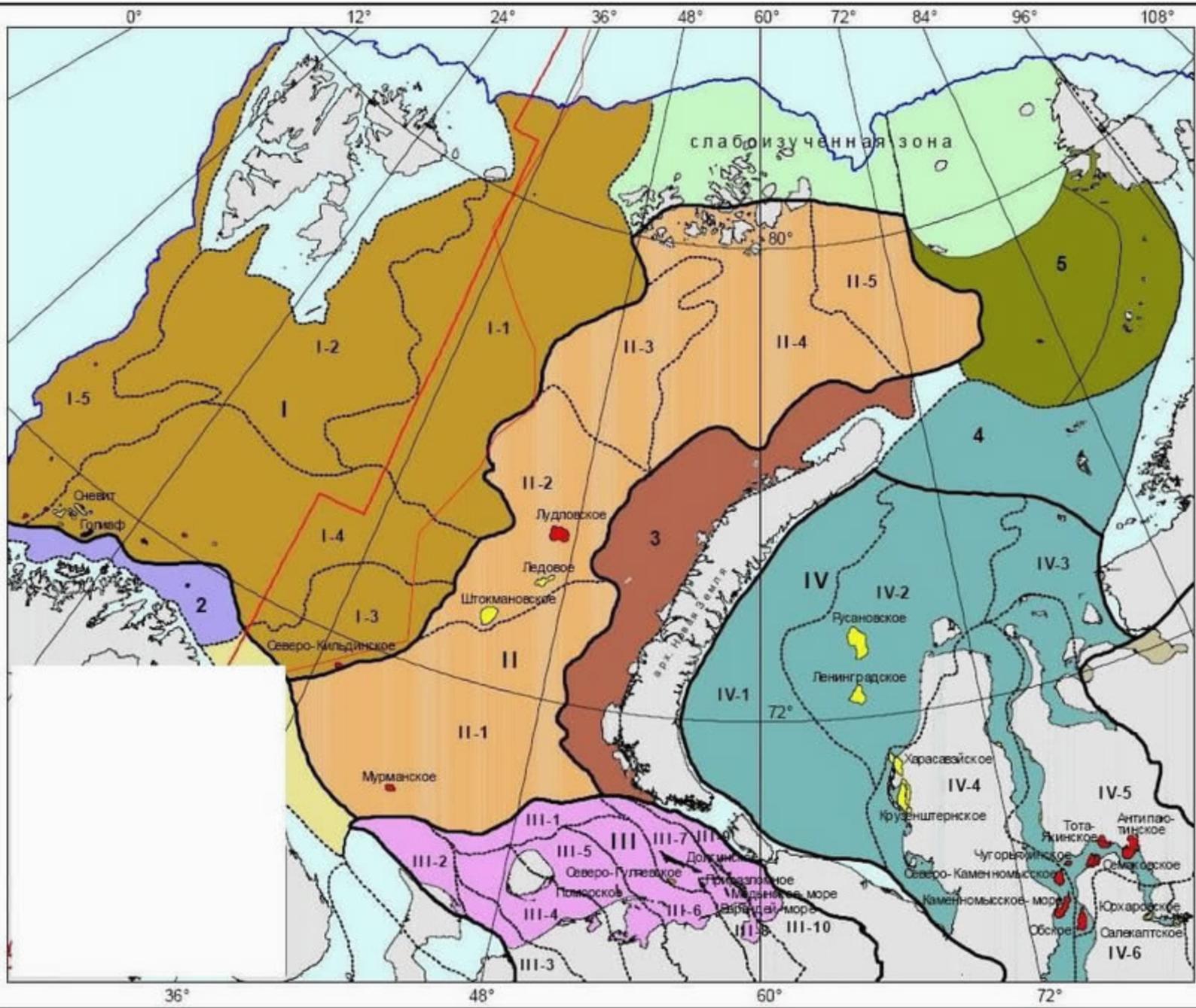
1. In accordance with Russia's energy strategy for the period up to 2020, development of an oil and gas industry on the Arctic sea shelves is the energy policy priority in the north-west federal district. In a long-term perspective, the Yamal Peninsula will become a priority region for gas production from a strategic point of view, along with other waters of Russia's northern seas. The development of fields in this region will involve a number of problems and will require significant investment due to difficult environmental and climatic conditions, the remoteness from existing oil and gas industry infrastructure, and the need to introduce new technological solutions for recovery and transport that ensures environmental preservation in polar conditions.
2. The situation in Russia's oil and gas industry is characterised by a reduction in explored oil and gas reserves and the slow rates of their reproduction. The volumes of geological exploration work do not guarantee reproduction of the raw materials base in the oil and gas industry. Only the most profitable and accessible parts of the fields and deposits are being developed.
3. At present, the All-Russian Scientific Research, Geological and Petroleum Institute within the Ministry of Natural Resources is drafting a "programme concerned with the integrated study and development of oil and gas reserves and resources in the north-west region", including a strategy for implementing geological survey work, on the basis of energy strategy regulations. This programme makes provision for the replenishment of the oil and gas raw materials base.
4. Oil and gas production in Russia over recent years has largely increased using infrastructure established previously. Therefore, the majority of companies are increasing oil and gas extraction primarily by renewing the production-related and technical potential of fields brought on line previously in regions which have already been opened. An essential increase in production volumes will require investment both in prospecting and in new infrastructure.
5. According to information from the Ministry of Natural Resources, deposits of recoverable resources from the Russian shelf exceed 100 billion tonnes of standard fuel. The ministry predicts that between 2020 and 2030, it is precisely these resources which will become the new resource base for oil and gas extraction in Russia.
6. Russia is inclined towards rejecting utilisation of the production sharing agreement plan. At a meeting of the Security Council of the Russian Federation in December 2006, it was declared that the practice of

⁸²

"The state of the mineral raw materials base of Russia's Arctic shelf and the future prospects for its development", Suprunenko O.I., Kaminsky V.D. (All-Russian scientific research institute concerned with geology and mineral resources in the Pacific Ocean named after I.S. Gramberg) - materials from the conference entitled "National marine policy and economic activities in the Arctic", Murmansk, 1-2 June 2006.

concluding production sharing agreements on file. 1 national interests. The Russian argument is that this is linked to the fact that investors participating in such agreements own a part of the raw materials recovered. However, since raw materials prices may increase, an agreement of this nature may become unprofitable for the State.

7. A discussion of the possibilities afforded the State by consolidating its own forces to develop the riches available on Russia's Continental shelf has become the main topic of conversation. In connection with this existing legislation on subsoil regulation is undergoing a change.
8. Federal law number 177- FZ "On export of gas" grants Gazprom the exclusive right to export gas from all fields in Russia. The European Union endeavor Moscow to ratify the European Energy Charter which would deprive Gazprom from their monopoly on export.
9. On the shelf of the Arctic seas, the largest subsoil user is Gazprom, which owns the licences for the Prirazlomnoe oil field and the Shtokman field. In 2007 it was decided that two governmental companies, "Gasprom" and Rosneft, will develop the Arctic and the Far East Shelves. The issue of creating a single State company from Gazprom, Rosneft and "Zarubezhneft" for extracting resources on the Russian shelf is being discussed.
10. Russia lacks the necessary infrastructure and technologies to develop oil and gas under the difficult conditions encountered in Polar areas.



APPENDIX I-ii

LIST OF FIELDS AND LOCAL STRUCTURES

Local structures on the shelf of the Barents Sea

THE WEST BARENTS SEA OIL AND GAS-BEARING PROVINCE

1	Severnaya
2	Severnaya-1
3	Field no. 8 (nameless)
4	Krainyaya
5	Field no. 3 (nameless)
6	Field no. 13 (nameless)
7	Field no. 14 (nameless)
8	Fersmanovskaya
9	Field no. 15 (nameless)
10	Field no. 16 (nameless)
11	Field no. 7 (nameless)
20	Oktyabrskaya
21	Demidovskaya
22	Kol'skaya
23	Yuzhnaya
24	Tsentral'naya
25	Varyazhskaya
26	Kurchatovskaya
27	Rybachinskaya

THE EAST BARENTS SEA OIL AND GAS-BEARING PROVINCE

41	Vostochno-Korginskaya
42	Kurentsovskaya
43	Severo-Kurentsovskaya
44	Severo-Murmanskaya
45	Zapadno-Nadezhdinskaya
46	Borovaya
47	Nadezhdinskaya
48	Field no. 44 (nameless)
49	Field no. 45 (nameless)
50	Akhmatovskaya
51	Andreevskaya
52	Field no. 46 (nameless)
53	Field no. 40 (nameless)
54	Severo-Nadezhdinskaya
55	Terskaya
56	Teriberskaya
57	Tulomskaya
58	Yuzhno-Tulomskaya
59	Severo-Tulomskaya
60	LNT no. 8
61	Britvinskaya
62	Field no. 21 (nameless)
63	Field no. 26 (nameless)
65	Field no. 24 (nameless)
66	LNT no. 7
67	LNT no. 3
68	Field no. 23 (nameless)
69	LNT no. 6
70	Field no. 22 (nameless)
71	Bortovaya
72	Field no. 39 (nameless)
73	Bezymyannaya
74	Field no. 43 (nameless)
75	Arkticheskaya
76	Field no. 41 (nameless)

77	LNT no. 5
78	Field no. 42 (nameless)
100	Field no. 20 (nameless)
102	Field no. 19 (nameless)
104	Field no. 18 (nameless)
106	Field no. 17 (nameless)
107	Medvezh'ya
108	Shatskoro
109	Yuzhno-Luninskaya
110	Luninskaya
111	Field no. 5 (nameless)
112	Vernadskoro
113	Field no. 2 (nameless)
114	Srednyaya
130	Perseevskaya
131	Field no. 6 (nameless)
132	Belaya
140	Field no. 1 (nameless)
141	Orlovskaya

TIMAN-PECHORA OIL AND GAS-BEARING PROVINCE

200	Korginskaya ATZ
201	Korginskaya ATR
202	Seduyakhinskaya-1
203	Seduyakhinskaya-2
204	Seduyakhinskaya-3
205	Izhma-Pechorskaya-2
206	Tiyyarminskaya
207	Yuzhno-Sengeyskaya
208	Izhma-Pechorskaya-1
209	Verkhnekaritseyskaya
210	Neiyunskaya
211	Severo-Neiyunskaya
212	Nerutskaya
213	Pechoramorskaya-1
214	Pechoramorskaya-2
215	Kuznetskaya
216	Prikolguevskaya LNT
221	Severo-Kolokolmorskaya
222	Kolokolmorskaya
223	Dresvyanskaya
224	Konstantinovskaya
227	Vostochno-Kolguevskaya
228	Razlomnaya
229	Severo-Pomorskaya
230	Vostochno-Pomorskaya
231	Pomorskaya-2
232	Khodovarihinskaya
234	Vostochno-Gulyaevskaya
235	Nesterovskaya
236	Bol'she-Gulyaevskaya
237	Zapadno-Gulyaevskaya
238	Alekseevskaya
239	Yuzhno-Gulyaevskaya
241	Bizekovskaya
242	Nireyskaya
243	Nadezhdinskaya
244	Madagachskaya
248	Shevelevskaya
249	Kamenskaya
250	Okinskaya
251	P-1
252	Severo-Russkaya
253	Russkaya
254	Yuzhno-Russkaya
255	Pakhanchesckaya

256 Sobol'ya
 257 Barovaya
 258 Field no. 37 (nameless)
 259 Field no. 48 (nameless)
 261 Varandey More-3
 262 Varandey More-2
 263 Varandey More-1
 271 Polyarnaya
 272 Zapadno-Polyarnaya
 275 Vostochno-Prirazlomnaya
 276 Stasovskaya
 278 Medynskaya More-1
 279 Medynskaya More-2
 287 Baltiyskaya-1
 288 Baltiyskaya-2
 289 Morskaya-1
 290 Morskaya-2
 291 Morskaya-3
 292 Kaliningradskaya
 293 V-1
 294 V-2
 295 V-3
 315 Severo-Dolginskaya
 316 Yuzhno-Dolginskaya
 317 Zapadno-Pokrovskaya
 318 Pokrovskaya
 319 Mertsayushchaya
 320 Piritovaya
 321 Reynekskaya
 322 Loginovskaya
 323 Zveroboinaya
 324 Prokofievskaya
 325 Morzhovaya
 326 Mikhailovskaya
 327 Zapadno-Matveevskaya
 328 Medynskaya More-3
 329 Sakhaninskaya
 330 Papaninskaya
 331 Seleznevskaya
 332 Vostochno-Pokrovskaya
 333 Rakhmanovskaya
 334 Yuzhno-Rakhmanovskaya
 335 LNT no. 16
 336 LNT no. 17
 337 Vostochno-Rakhmanovskaya
 338 Vaigatchskaya
 339 Matveevskaya

THE PROBABLE INDEPENDENT OIL AND GAS AREA
 IN KOLA

490 Kol'skaya LNT

THE POTENTIALLY PRODUCTIVE INDEPENDENT
 OIL AND GAS AREA IN ADMIRALTEY-
 PRINOVOZEMEL

500 Mezhdusharskaya
 501 Zapadno-Novozemel'skaya
 502 Gusinozemel'skaya
 503 Dmitrievskaya
 504 LNT no. 4 (nameless)
 505 Mityushikhinskaya
 506 Field no. 27 (nameless)
 507 Field no. 28 (nameless)
 508 Field no. 29 (nameless)
 509 Field no. 30 (nameless)

510 Field no. 31 (nameless)
 511 Field no. 32 (nameless)
 512 Field no. 33 (nameless)
 513 Krestovaya
 514 Vostochno-Krestovaya
 515 Admiralteyskaya
 516 Pakhtusovskaya
 517 Litke
 518 Sul'menevskaya
 519 Severo-Sul'menevskaya
 520 Field no. 34 (nameless)
 521 Field no. 35 (nameless)
 522 Field no. 36 (nameless)
 523 Field no. 37 (nameless)
 524 Field no. 38 (nameless)
 525 Pankret'eva
 526 Field no. 4 (nameless)
 527 Blednaya
 528 Inostrantseva
 529 Field no. 10 (nameless)
 530 Field no. 11 (nameless)

Fields in the Nenetsk autonomous district (on dry land)

TIMAN-PECHORA OIL AND GAS-BEARING
 PROVINCE

217 Peschanoozerskoe
 218 Tarkskoe
 219 Korovinskoe
 225 Khy'l'chuyuskoe
 226 Yuzhno-Khy'l'chuyuskoe
 245 Passedskoe
 246 named after A. Titov
 247 named after R. Trebsa
 265 Varandeyuskoe
 266 Toraveyskoe
 267 Yuzhno-Toraveyskoe
 268 Naul'skoe
 269 Labaganskoe
 270 Sed'yaginskoe
 277 Mezhdurechenskoe
 280 Medynskoe
 281 Saremboskoe
 282 Zapadno-Lekkeiyaginskoe
 283 Severo-Saremboskoe
 284 Myadseiskoe
 285 Toboiskoe
 286 Ust'-Talotinskoe
 340 Kumzhinskoe
 341 Yareiyuskoe
 342 Tabrovoyakhinskoe
 343 Syurkharatinskoe
 344 verkhnekolvinskoe
 345 Pyuseiskoe
 346 Visovoe

Local structures on the shelf of the Kara Sea

West Siberian oil and gas-bearing province

1 Loshkinskaya
 2 Deverskaya
 3 Navolokskaya
 4 Zapadno-Sverdrupskaya
 5 nameless field
 6 Vil'kitskoro-2
 7 Anabarskaya
 8 Vernovskaya

9	Monskaya	76	Kharasaveiskaya
10	Severo-Ragozinskaya	77	Beloostrovskaya
11	Rozevskaya		
12	Ragozinskaya-2		
13	Ragozinskaya-1		
14	Flissingskaya		
15	Vostochno-Flissingskaya		
16	Zapadno-Ragozinskaya		
17	nameless field		
18	nameless field		
19	nameless field		
20	Dal'nyaya		
21	Nansena		
22	Edvarda		
23	Kropotkina		
24	Vlas'evskaya		
25	nameless field		
26	Universitetskaya		
27	Naypokoevna		
28	Matusevicha		
29	Rozhdes Tvenskoro		
30	nameless field		
31	Zapadno-Rusanovskaya		
32	nameless field		
33	nameless field		
34	Bogushevicha		
35	Vikulovskaya		
36	Tatarinovskaya		
37	Gallskaya		
38	Severnaya		
39	Lutkovskaya		
40	Zapadno-Skuratovskaya		
41	Skuratovskaya		
42	Nyarmeiskaya		
43	nameless field		
44	nameless field		
45	Severo-Leningradskaya		
46	Yuzhno-Rusanovskaya		
47	Nevskaya		
48	Voroninskaya-1		
49	Voroninskaya-2		
50	nameless field		
51	nameless field		
52	Morskaya		
53	Petrovskaya		
54	nameless field		
55	Severo-Kharasaveiskaya		
56	Akvamarinskaya		
57	Zapadno-Akvamarinskaya		
58	Mininskaya-1		
59	Mininskaya-2		
60	Severo-Obruchevskaya		
61	nameless field		
62	Obruchevskaya		
63	Steregushchaya		
64	Anderminskaya		
65	nameless field		
66	nameless field		
67	nameless field		
68	Severo-Sharapovskaya		
69	nameless field		
70	nameless field		
71	Sharapovskaya		
72	Kruzenshternovskaya		
73	Shkiperskaya		
74	Severo-Baidaratskaya		
75	Zapadno-Sharapovskaya		

APPENDIX I-iii

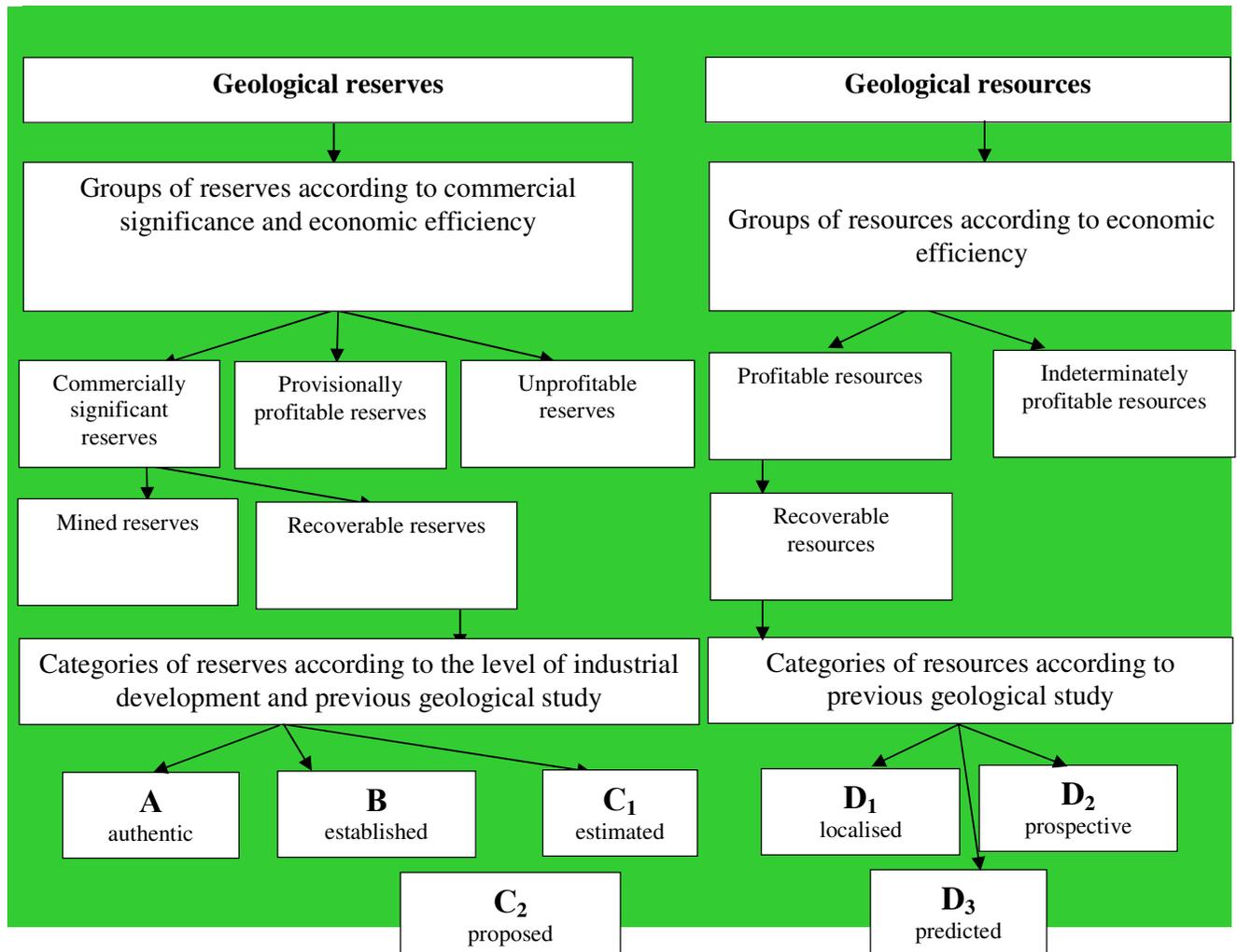
The classification of hydrocarbon reserves

In Russia, the “Classification of field reserves, prospective and predicted oil and combustible gas resources”, was affirmed by Resolution No. 299 of the Council of Ministers of the USSR dated April 8, 1983. In 2004, a new classification for reserves was drawn up. At the heart of the new Russian classification is the old framework classification adopted by the UN in March 1997 (UN Framework Classification or UNFC), which is based on indices of the economic efficiency of development, the degree of industrial development and the level of previous geological study. While the recalculation of all the oil and gas reserves according to the new classification system is not yet complete, according to prognoses by experts from the All-Russian Scientific Research, Geological and Petroleum Institute, and the Ministry of Natural Resources, it will be finished in the near future.

This classification lays down the unified principles for computation and the State calculation of field reserves and prospective oil and combustible gas reserves according to the results of geological exploration work and field development.

Data pertaining to field reserves and areas with future prospects is used for the following: drawing up development charts and arranging sectors of the national economy; compiling State plans concerned with economic and social development; planning geological exploration work; and designing plans for extracting, transporting and integrated processing of oil and gas. Data regarding long-term oil and gas resources is used when planning exploration and surveying work.

The new Russian classification based on previous geological study and degree of industrial development determines the categories of reserves and resources, while groups of reserves and resources are allocated on the basis of the level of economic efficiency (fig. 3).



There is no arrow to C2 above!

New classification of hydrocarbon reserves

Reserves are divided up between authentic (category A), established (category B), estimated (category C₁) and proposed sources (category C₂). Resources are subdivided between localised (category D₁), prospective (category D₂) and predicted sources (category D₃). Ultimate potential reserves and resources and current potential reserves and resources are also subdivided. Specific economic indices which characterise the efficiency with which monetary funds are utilised represent the criteria whereby reserves are divided into groups (commercially significant, provisionally profitable and unprofitable). Recoverable resources, in turn, are classified according to profitable and indeterminately profitable. Commercially significant reserves are subdivided according to reserves which are profitable under normal circumstances and those which are provisionally profitable.

The new system introduces, for the first time, the concept of economic profitability of production which completely changes the notion of recoverability, transferring it from the technological sphere to that of economic expediency.

APPENDIX I-iv

LICENSING SUBSOIL MANAGEMENT

A list of normative and legal acts

Comments by a legal expert

Licensing is one of the most widely utilised administrative and legal instruments in the sphere of resource management and environmental protection.

Ecological licensing represents an authorising system which implies a collection of ecological environment bodies which are authorised to issue and annul licences, execute process-related practices for issuing licences, and issue material and legal standards which regulate licence content and conditions.

All forms of special resource management (subsoil management) are subject to licensing.

Obtaining a licence constitutes a basis for acquiring the rights to utilise resources and carry out forms of activity associated with environmental protection.

It is prohibited under law to carry out environmental activities without a licence (if one is required) and constitutes a basis for applying measures concerned with juridical and administrative responsibility, and criminal liability, to the guilty party.

Ecological licensing fulfils a range of functions: information, inspection-related and preventative, as well as being one of the guarantees whereby the rights of citizens to a favourable environment are enforced.

From 17 July 2005, licensing was terminated in relation to the following types of activity:

- the utilisation of main pipelines for transport;
- the utilisation of oil and gas production operations;
- oil and gas reprocessing and products originating therefrom
- the transportation of oil and gas, and products which originate from the reprocessing of these products, by main pipeline;
- the storage of oil and gas, and products which originate from the reprocessing of these products;
- and others.

Ecological licensing is regulated by the following normative and legal acts:

- Article 30 of Federal Law No. 7 dated 10.01.2002 “regarding environmental protection” stipulates that separate forms of activity in the sphere of environmental protection are subject to licensing.
- Federal Law No. 128 dated 08.08.2001 “regarding the licensing of separate forms of activity” contains a list of several forms of ecologically significant activity which are subject to licensing (the utilisation of dangerous production facilities), although the law directly stipulates that its provisions do not extend to activities associated with environmental protection and resource management.
- Federal Law No. 187 dated 30.11.1995 “regarding the Continental shelf of the Russian Federation”:
 - Article 8 lays down licensing requirements in relation to activities concerned with the regional geological study of the Continental shelf, the search, surveying and development of mineral resources.
 - Article 12 lays down licensing requirements in relation to activities concerned with mining on the Continental shelf.
- Federal Law No. 2395-1 dated 21.02.1992 “regarding subsoil” - Articles 11 and 12 set out the concept and content of the licence relating to subsoil management.
- Resolution No. 3314-1 of the Supreme Soviet of the Russian Federation dated 15.07.1992 “regarding the licensing procedure for subsoil management” lays down the licensing procedure for the right to use subsoil as regards carrying out work concerned with geological study of the

subsoil, the development of mineral resource fields, the construction and operation of underground structures not connected with the extraction of mineral resources, the utilisation of by-products from mining and associated reprocessing production operations, as well as the establishment of specially protected facilities.

- Resolution No. 382 of the Government of the Russian Federation dated 04.06.2002 “regarding the licensing of activities in the sphere of industrial safety in relation to hazardous production facilities and the execution of underground surveys.
- On 12 February 2001, the Government adopted Resolution No. 102 approving “Rules for registering licences (authorisations), issued to Russian and foreign legal entities, for the use of aquatic biological resources in the exclusive economic zone of the Russian Federation”.
- Letter No. VO-61/2296 from the Russian Subsoil Committee dated 10.09.1992 “regarding provisions concerning the licensing procedure for subsoil management”.
- Order No. 487 dated 15.07.2005 “regarding the implementation of Federal Law No. 80 dated 2 July 2005 “regarding the incorporation of changes to the Federal Law “regarding the licensing of separate forms of activity”.
- Federal Law “regarding protecting the rights of legal entities and individual owners when carrying out State inspections (supervision) and the Code of the Russian Federation concerning administrative offences”.

APPENDIX I-v

RESOURCES VIEWED AS NATIONAL PROPERTY. THE RIGHTS OF FOREIGNERS A list of normative and legal acts

Comments by a legal expert

Existing Russian legislation consolidates the rights and responsibilities of foreigners in the sphere of subsoil management. Foreign subsoil users have the same rights and responsibilities as their Russian counterparts, except for several restrictions which are discussed below.

The following constitute normative and legal acts which regulate the rights and responsibilities of foreigners in the sphere of subsoil management:

- **The Constitution of the Russian Federation**, adopted by a national vote on 12.12.1993 - Articles 9 (Section 2.8), 36, 42 and 58.

- **Federal Law No. 2395-1 dated 21.02.1992 “regarding subsoil”:**

- Article 1.2 reads as follows: Subsoil within the Russian Federation, including the underground expanse and mineral and other resources, constitute State property.

Subsoil areas cannot be bought, sold, given as a present, mortgaged or transacted in any other way under civil law.

The law only allows the transfer of rights to use the subsoil from one party to another to the extent provided for in Article 17.1 of the law (the reorganisation of legal entities, the cessation of their activities and so on).

Extracted mineral resources and other resources may take all forms of ownership (State, municipal, private).

- Article 9 stipulates in concrete terms that parties able to use the subsoil may be foreign citizens and legal entities, provided restrictions are not laid down under law.

- Restrictions for foreigners are laid down in **Federal Law No. 187 dated 30.11.1995 “regarding the Continental shelf of the Russian Federation”**.

- Paragraph 12 item 6 reads as follows: the Federal State authorities have a right to declare individual areas of the Continental shelf closed to foreign states, natural persons and legal entities in the Russian Federation, natural persons and legal entities of foreign states, and competent international maritime scientific research organisations in connection with the (planned) conducting of activities concerned with the surveying and development of mineral resources and fishing in the areas indicated, with the coordinates for the closed areas notified in the “Instructions to Mariners”.

- Section 4.7 - Granting areas to users is determined on the basis of Russia’s economic interests and is realised in such a way that, other things being equal, preference is given to those users which utilise Russian industry as far as possible.

- Section 5.7 - In the interests of guaranteeing security and the development of industry and energy policy within the Russian Federation by granting licences to interested Federal executive bodies, restrictions can be introduced on the participation of foreign users in competitions (auctions) related to the search for, surveying and development of mineral resources in individual areas, and by making such competitions (auctions) only open to Russian users.

- Section 9.8 obliges foreign users to only carry out regional geological study, exploration, surveying and development of mineral resources in the presence of an official from the bodies concerned with the preservation of the Continental shelf, as set out in Article 42 of this law, and under his supervision.

Foreign users are obliged to effect the free passage of conservation agencies to the place where work is being carried out, and back, to guarantee radio communication, and to bear all the costs associated

with the upkeep, accommodation and full protection of officials from these agencies on a level with that accorded their own executives.

Foreign declarants may only use living resources for scientific, commercial and other purposes on the basis of international agreements concluded between the Russian Federation and the State in question (Section 3.11). In this connection, Russian declarants (defined categories) have first choice when it comes to using living resources.

Foreign vessels have additional responsibilities vis-à-vis conservation agencies when fishing (Section 7.14) and carrying out other activities (Section 3.20).

The procedure whereby authorisation is obtained to carry out marine scientific research and to create and use man-made islands, installations and structures on the Continental shelf is somewhat different from that for Russian users (Sections 3.17, 5, 6, and 8.23). Procedural peculiarities are also provided for in Sections 2.28 and 2.35.

▪ **Federal Law No. 225 dated 30.12.1995 “on production sharing agreements”** makes provision for the possibility of foreign investment when searching for, surveying and extracting mineral raw materials on Russian territory, as well as on the Continental shelf, under conditions laid down in production sharing agreements which have been concluded with the Russian Government. An agreement of this nature is concluded with the winner of the auction, this party being the participant who offered the highest price for the right to enter into this agreement. The conditions under which the auction takes place must make provision for the proportional participation, to be determined by the Russian Government, of Russian legal entities in the execution of agreements.

The law lays down the conditions under which the work is to be carried out as stipulated in the agreement (Article 7):

- responsibilities on the part of the investor to give preference to Russian legal entities when involving contractors, suppliers and ferrymen;

- a responsibility in terms of ensuring that at least 80% of the workers are Russian nationals when hiring, and that foreign workers are only used in the initial stages or in the absence of Russian workers and specialists;

- a responsibility in terms of ensuring that at least 70% of the total cost of equipment acquired each calendar year is of Russian origin. In this connection, the equipment is regarded as being of Russian origin if it is manufactured by Russian legal entities and/or Russian citizens in Russia from components, at least 50% of the manufacture of which (expressed in terms of the cost) is carried out on the territory of the Russian Federation by Russian legal entities and/or Russian citizens;

The responsibilities indicated apply to both Russian and foreign investors.

APPENDIX I-vi

Norwegian oil and gas activity in the Norwegian Barents Sea:

The Snow white project is a receiving and processing plant on Melkøya Island outside Hammerfest. It is a production and landing facility of natural gas from the Snøhvit, Albatross and Askeladd fields in the Barents Sea. The fields will be produced through 20 wells. It is the Europe's first export facility for liquefied natural gas (LNG). The gas will be exported to Europe and USA. The investment is expected to be between 49.3 and 51.3 billion Norwegian crowns. The operator of the project is Statoil. The field was found in 1981.

The Goliat field: was discovered in 2000. The reserves are estimated to be 250 million barrels of oil equivalents, made up of 75% oil and 25% gas. The field is 50 km southeast of the Snøhvit field. 5 wells have been drilled. The project is still in the planning. ENI Norge is the operator.

The nucola oil field is the latest discovery in the Norwegian part of the Barents Sea. Hydro will be the operator of the field. The test drilling in 2007 was of great controversy. The field is situated only 44 kilometers from land. An oil spill will reach one of Europe's biggest bird mountains in only 30 hours. The area is also of major importance to fish eggs and larvae.

APPENDIX I – vii

Incomplete list of Gazprom Subsidiaries (Source: Wikipedia).

100% ownership

- Astrakhangazprom
- Bashtransgaz
- Burgaz
- Ecological and Analytical Center for the Gas Industry
- Gazpromexport
- Gazflot
- Gazkomplektimpex
- Gaznadzor
- Gazobezопасnost
- Gazoenergeticheskaya Kompaniya
- Gazpromavia
- Gazpromenergo
- Gazprominvestarena
- Gazprominvestholding
- Gazpromokhrana
- Gazpromrazvitiye
- Gazpromstroyengineering
- Gazsvyaz
- Informgaz
- Informgazinvest
- Irkutskgazprom
- IRTs Gazprom
- Kaspiygazprom
- Kavkaztransgaz
- Kubangazprom
- Lentransgaz
- Mostransgaz
- Mezhrefiongaz
- Nadyngazprom
- Nadymsstroygazdobycha

- NIIgazekonomika
- Novy Urengoy Gas Chemicals Company
- Noyabrskgazdobycha
- Science & Production Center Podzemgidromineral
- Orenburggazprom
- Permtransgaz
- Podzemgazprom
- Samaratransgaz
- Severgazprom
- Severneftegazprom – holder of the licenses to develop the Yuzhno-Russkoye field
- Sevmorneftegaz - holder of the licenses to develop the Shtokman and Prirazlomnoe fields.
- Surgutgazprom
- Szhizhenny gaz
- Tattransgaz
- Temryukmortrans
- Tomsktransgaz
- TyumenNIIgiprogaz
- Tyumentransgaz
- Uraltransgaz
- Urengoygazprom
- Volgogradtransgaz
- Volgotransgaz
- VNIIGAZ
- Yamalgazinvest
- Yamburggazdobycha
- Yugtransgaz

[edit] Ownership over 50%

- Dialoggazservice
- Ditangaz
- Electrogaz
- Fora Gazprom
- Future Fatherland Fund
- Gazenergосervice

- Gazcom
- Gazmash
- Gazprombank
- Gazpromgeofizika
- Gazprom Neft
- GazpromPurInvest
- Gazpromtrubinvest
- Gaztelekom
- Giprogaztsentr
- Giprospetsgaz
- Krasnoyarskgazprom
- Orgenergogaz
- Promgaz
- SevKavNIPIGaz
- Sibur
- Tsentrenergogaz
- Tsentrgaz
- VNIPIGazdobycha
- Volgogaz
- Volgogradneftemash
- Vostokgazprom
- Zapsibgazprom
- Zarubezhneftegaz

[edit] Ownership 50% or less

- Achimgaz (50%) - joint venture with BASF
- Caspian Oil Company
- GazAgroFriport
- Gaztransit
- Gaz-Truby
- Horizon Investment Company
- Novatek (19.9%)
- Prometey-Sochi
- RNKB

- Rosneftegazstroy
- Rosshelf
- SOGAZ Ltd. Insurance Group (100% before 2004)
- Stroytransgaz
- TsentrKasneftegaz (50%) - joint venture with Lukoil to develop Tsentralnaya field in the Caspian Sea (jointly with KazMunayGas)
- Tyumen Hotel
- Vega Investment Company
- VIP-Premier
- Vologdapromresurs
- YuzhNIIGiprogaz
- Zavod TBD

[edit] Armenia

- Armrosgazprom (45%)

[edit] Austria

- GHW (50%)- a joint venture with OMV
- ZGG-Zarubezhgazneftechim Trading GmbH
- ZMB Gasspeicher Holding GmbH (66,67%)

[edit] Belarus

- Belgazprombank (50%)

[edit] Bulgaria

- Topenergo (100%)
- Overgas Inc. AD (50%) - a joint-venture with Overgas Holding AD

[edit] Cyprus

- Leadville Investments Ltd

[edit] Czech Republic

- Gas-Invest S.A. (37.5%)
- Vemex s.r.o. (33%)

[edit] Estonia

- Eesti Gaas AS (37.02%)

[edit] Finland

- Gasum Oy (25%)
- North Transgas Oy (100%) - former company for planning and construction of North European Gas Pipeline

[edit] France

- Frangaz (50%) - a joint venture with Gaz de France

[edit] Germany

- Agrogaz GmbH (100%)
- Ditgaz (49%)
- Verbundnetz Gas (5.3%)
- Gazprom Germania GmbH (100%)
- Wingas GmbH (35%) – a joint venture with Wintershall, the subsidiary of BASF
- Wintershall Erdgas Handelshaus GmbH & Co. KG (50%)
- ZMB GmbH (100%)

[edit] Greece

- Prometheus Gas (50%) - a joint company with Copelouzos Group

[edit] Hungary

- Panrusgas Rt (40%) - a joint venture with MOL
- Borsodchem (25%)
- TVK (13.5%)
- DKG-EAST Co (38.1%)

[edit] Italy

- Volta SpA (49%) - a joint venture with Edison S.p.A.
- Promgas (50%) - a joint venture with ENI

[edit] Kazakhstan

- KazRosGaz (50%) - a joint venture with KazMunayGas

[edit] Kyrgyzstan

- Munai Myrza

[edit] Latvia

- Latvijas Gāze (25%)

[edit] Lithuania

- Lietuvos Dujos (37.1%)
- Kaunas CHP (100%)
- Stella Vitae (30%)

[edit] Moldova

- Moldovagaz

[edit] The Netherlands

- BPS B.V. (50%) - operator of the Blue Stream pipeline
- Gazprom Finance B.V.
- PeterGaz B.V.
- Slovak Gas Holding B.V. – owns 49% of shares in SPP, a Slovak gas company

[edit] Poland

- EuRoPol Gaz (48%) – operator of the Polish section of Yamal-Europe pipeline

[edit] Romania

- WIROM (25%)

[edit] Serbia

- JugoRosGaz (50%)
- Progress Gas (50%)

[edit] Switzerland

- Baltic LNG AG (80%) - a joint venture with Sovkomflot for the development and sale of LNG
- Nord Stream AG (51%) – operator of the planned Nord Stream pipeline
- ZMB (Schweiz) AG (100%)
- Gas Project Development Central Asia AG (50%) - a joint venture with Centrex Gas & Energy Europe AG

[edit] Turkey

- Bosphorus Gaz Corporation AS (40%) - a joint venture with Tur Enerji
- Turusgaz (45%) - a joint venture with BOTAS

[edit] Ukraine

- YuzhNIIgiprogaz

[edit] The United Kingdom

- Gazprom Marketing and Trading Limited (GM&T) (100%)
- Interconnector (UK) Limited (10%) - operator of the Interconnector pipeline