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Status per January 2005

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The authors Alexei Bambulyak (left) and Bjørn Frantzen have been working for more than 10 years on environmental cooperation in the Barents Euro-Arctic Region with special emphasis on Russia. Bjørn Frantzen lead the Norwegian Polar Institute in Svalbard, and Alexei Bambulyak was a project manager at the Karelian Information Barents Centre in Petrozavodsk, Russia. Since 1997, both have their daily work at Svanhovd Environmental Centre located on the border with Russia. Frantzen and Bambulyak lead the Barents Council Environmental Management Programme for the Murmansk Region (EMP-Murmansk), and have been facilitating the environmental capacity building projects in North-West Russia under the Joint Norwegian-Russian Environmental Commission. In addition, they are working as advisers for the International Contact Forum on Habitat Conservation in the Barents Region (HCF), GEF-ECORA project for the Kolguev Island, and other environmental processes in the Russian Barents. The authors have personally visited many of the sites described in this report, had meetings with environmental authorities, petroleum and transport companies working in the region. The present work also describes their experience undertaken in this sphere.

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Front page: The tanker *Alexander Sledzyuk* loading oil in Vitino (White Sea) during the winter period.

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Contents

1. Summary

Oil transportation from the Russian part of the Barents Region along the Norwegian coast had insignificant volumes before 2002. However, in 2002 there was a dramatic increase in oil shipment, and then 4 million tons of oil were transported along the northern regions. In 2003, the volume reached 8 million tons. The tendency continued in 2004, and about 12 million tons of export oil and oil products were delivered from the Russian part of the Barents Region to the western market along the Norwegian coast. According to the analysis carried out by the Norwegian authorities, the annual export of the Russian oil being shipped along the Norwegian coast may reach the volume of 50-150 million tons in the next decade. The size of oil transportation volumes depends on the perspective of constructing a new trunk pipeline to the Russian coast of the Barents Sea from the oil fields in Western Siberia. The major oil consuming markets, USA, Japan, China, and European countries, are negotiating with Russia about the possibilities of getting access to the country's large oil and gas resources. And one of the main reasons for this is the fact that Europe and USA wish to be less dependent on the Middle East oil. Russia is also interested in extracting oil and gas resources in the Arctic and developing the Northern Sea Route.

In the present report on oil transportation from Russia, we have given special attention to the description of the existing and prospected offshore and onshore oil shipment terminals, their connection to the oil reserves on one hand and to the export routes on the other. In this report we demonstrate that even without a trunk oil pipeline from Western Siberia to the Barents Sea coast, the annual oil exports from the Russian part of the Barents Region may reach a volume of about 50-100 million tons in the next decade. About 40 million tons of crude oil and oil products can be delivered by railway to the ports of Murmansk in the Barents Sea, and Kandalaksha, Onega, Severodvinsk and Arkhangelsk in the White Sea. In addition, up to 20 million tons of oil will come from the oil fields in the Nenets Autonomous Region, and from Prirazlomnoye oil field in the Pechora Sea. Prirazlomnoye is the first offshore industrial oil field in the Russian part of the Barents Region, the operations there will go on all year round, and most of the year in ice-covered waters. There will be a considerable increase in the amounts of oil shipped from Western Siberia; about 30 million tons of oil can be delivered annually via the terminals in the Kara and Laptev Seas with transshipment in the Kola Bay of the Barents Sea.

In the European part of Russia there are three possibilities for shipping oil for export. The first way is through the Black Sea via Bosporus to the Mediterranean Sea. Another route is through the Baltic Sea via the Gulf of Finland and Kattegat. The third alternative is to transport oil through the Barents Sea along the coasts of northwestern Russia and northern Norway. Out of these three options only the northern one, the Barents Sea route, can provide the possibility of shipping large amounts directly to European and other major harbours.

Oil pollution prevention is the central issue that concerns oil transportation in the Barents Sea. The report describes rules and regulations for oil pollution prevention that Russian and Norwegian authorities apply to oil shipment in the Barents Sea. The increasing internationalisation of the transport system in the region appears to affect the present trend toward more advanced and safer vessels that comply with international safety rules. Early warning and notification of ships passing through the Norwegian waters has been used more frequently and on voluntary basis, but still not as often as desired and can be arranged within the governmental agreement. The estabalishment of traffic control centres in Vardø and Murmansk will considerably improve the oil spill prevention and response preparedness.

2. Introduction

Oil transportation along the coastline of northern Norway is one of the hottest topics discussed in the region for the recent two years. It is also an important issue of today's political agenda and bilateral discussions between Norway and Russia.

In 2003, Svanhovd Environmental Centre published the first report "Oil transport from the Russian part of the Barents Region" where we described the existing and planned oil terminals in the Russian part of the Barents Region. The purpose of this extended and updated report is to provide the reader with new and additional information. We believe this is of crucial importance as the organisation of the oil shipment through the Barents Sea is constantly changing. This report presents the ongoing oil transportation activities in the time period from 2002 to 2004 in the Russian part of the Barents Euro-Arctic Region. Moreover, this report gives an overview of the oil production and transport systems, as well as some environmental aspects of the oil shipment.

In the first section "Oil production in the Russian part of the Barents Region", we give information about reserves of hydrocarbons, oil production and petroleum development potential with a major focus on the Timano-Pechora oil-and-gas province and the western Arctic shelf of Russia.

General information about the transport systems in Russia, including information about railways, waterways and pipelines are given in the next section "Transport system in Russia". Further, we present information about the oil transportation routes in the Barents Region where the Russian oil loading terminals with transhipment schemes and export routes are described.

In the third section "Environmental aspects", we present some environmental topics related to the oil shipment. Environmental policies in Russia and Norway and oil pollution prevention systems in both countries are here described. We also look at environmental problems that have occurred as a result of the petroleum activities and oil shipment in the region. In particular, we focus on accidental oil spills in Russia and Norway with special attention to the ship accidents.

In the last chapter we give our own reflections and comments about oil transportation safety, and point out factors that we believe are essential to achieve efficient oil spill protection inside the Russian Barents and further along the Norwegian coast. The report has used a number of sources that are given in detail in the list of references. In short, these sources of information consists of press releases from governmental institutions and transport and petroleum companies, news published by information agencies and local newspapers, as well as materials from the web sites of the organisations working with petroleum and environmental issues in Russia and Norway. Also, the facts of the report have been discussed with authorities, petroleum and transportation companies, research institutions, and environmental NGOs in Russia and Norway.

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The Barents Euro-Arctic Region was founded in 1993. Today it includes 13 regions: Finnmark, Troms and Nordland in Norway; Norrbotten and Västerbotten in Sweden; Lapland, Oulu and Kainuu in Finland; Murmansk and Arkhangelsk Regions, the Republics of Karelia and Komi, and the Nenets Autonomous Region in Russia.

Figure 2.1 Map of North-Russia. The red dots with numbers point out the locations (1-13) where there is oil export from Russia towards North-Norway. These 13 locations are presented in this report. From east to west the locations are: (1) The town of Tiksi located east of where the river Lena flows into the Laptev Sea, (2) The town of Dikson located east of where the river Yenisey flows out into the Kara Sea, (3) The reloading area in the Ob Bay, (4) The oil terminal in Varandey in the Pechora Sea, (5) The Prirazlomnoye oil field in the Pechora Sea, (6) The oil terminal on the eastern shore of Kolguev Island in the Pechora Sea, (7) Indiga on the coastline of the Pechora Sea is for the moment the location for a planned pipeline from Western Siberia, (8) The Talagi oil terminal in the river Severnaya Dvina, (9) The new oil terminal in Severodvinsk at the mouth of Severnaya Dvina River, (10) The Onega Bay, White Sea, that had a reloading terminal in 2003, new activities are planned, (11) The oil terminal Vitino located in the Kandalaskha Bay east in the White Sea, (12) The five oil terminals in the Kola Bay, (13) The planned reloading terminal in the Bøkfjord outside the town of Kirkenes.

3. Oil production in the Russian part of the Barents Region

The main sources of information for the articles in this section were the report of the Ministry of Energy of Russia for the meeting of the Russian Government "On main directions for the development of the oil-and-gas complex of the North-western Region of Russia" held in April 2003, and the reports and materials of the Ministry of Nature Resources of Russia meeting "Prospects of hydrocarbon resources development in the North-West of Russia" held in February 2004 in Arkhangelsk. We also used macro-statistics data published by the Prime-Tass economic information agency, press releases of the regional Administrations of the Republic of Komi and the Nenets Autonomous Region, and news of the national and regional information agencies.

The amounts of hydrocarbon resources of the Russian part of the Barents Euro-Arctic Region are mostly dependent of the Timano-Pechora oil-and-gas province resources located in the territory of the Republic of Komi and the Nenets Autonomous Region. The recent development of the oil fields on the shelf of the Barents and the Pechora Seas represents a considerable potential for oil and gas resources development, where, despite scanty geological data for the area, a number of large gas and oil fields have recently been discovered.

Production levels in the Timano-Pechora province were at their highest level so far in the beginning of the 1980s (approximately 20 million tons a year), but then the production volume dropped considerably due to the economic problems of the country. In the early 1990s, an intensive growth of oil exploration and production occurred; in 2002 the oil production volume in the Russian part of The Barents Region was 14.7 million tons, and in 2004 it reached the level of 20.7 million tons. According to the Russian Governmental estimate, the oil resources of Timano-Pechora province are capable of increasing the oil production volume and reaching the level of 40-45 millions tons a year for the period of 2010-2020. The increase in oil production will be accompanied by a growing demand for transportation capacity; this will become urgent after 2005, when the Nenets Autonomous Region and the Arctic shelf fields will enter their production stage.

3.1 RESERVES OF HYDROCARBONS

Natural occurrence of oil in the area of the Ukhta River was first registered as long ago as in 1762, and for the first time oil was collected on the Yarega, a tributary of the Ukhta River. Then a merchant, Fiodor Priadunov, built the first primitive oil refinery. Samples of oil were sent to Saint Petersburg, and subsequently abroad for further analysis. Numerous attempts to organise thorough research and production before the Revolution did not bring any success, but in 1929 the first full scale expedition made a systematised survey of all mineral resources of the Russian European North, including oil. In 1930, on the Chibyu River, within the borders of modern Ukhta town, oil from Devonian sandstones was extracted in Russia for the first time.

Systematic exploration in the Timano-Pechora province has been conducted since 1929, but a real breakthrough was made during the last 40 years with discovery of large prolific oil fields (Western Tebukh, Pashninskoye, Usinskoye, Vozeyskoye, Kharyaginskoye, etc.) and the Vukhtyl oil and gas field. These discoveries drew attention to the region, which in turn allowed increasing the speed of geological exploration. New explorations let the industry re-evaluate the volume of the proven oil reserves, gas and condensate reserves and organise full-scale production.

According to the Russian Ministry of Natural Resources, at present there are over 200 oil and gas fields in the Timano-Pechora province with the currently proven reserves of oil exceeding 1.3 milliard tons and 643.5 milliard cubic metres of non-associated gas (including gas caps). In 2002, the total volumes of oil production in the province have reached 404.8 million tons of oil, 395.4 milliard cubic metres of non-

associated gas, and 46.9 million tons of condensate. Even with these impressive figures, Timano-Pechora has a significant geological potential of oil reserves and good prospects to increase hydrocarbon production for a long period in the 21st century.

In both mid-term and long-term prospects, the Northwest of Russia will remain one of the regions providing oil and gas for the internal and world markets. The production and export growth in the region beyond 2020 (as well as keeping the production at the present high level) can only be possible if the existing large shelf oil and gas fields are fully developed, and new fields both in Timano-Pechora province and on the shelves of the Barents and Pechora Seas are discovered as predicted.

According to the Russian Ministry of Energy, initial recoverable hydrocarbons in the Northwest of Russia on land and at sea reach the volume of 34.0 milliard tons, including 6.7 milliard tons of oil, 0.6 milliard tons of gas condensate, and 26 400 milliard cubic metres of gas.

For the year 2002 the explored oil reserves in the Nenets Autonomous Region amounted to 819 million tons, in the Republic of Komi 493 million tons, and on the shelves of the adjacent seas 62 million tons.

The explored gas reserves in the Nenets Autonomous Region were on the level of 484 milliard cubic metres; in the Republic of Komi 161 milliard cubic metres; and on the shelves of the adjacent seas 2800 milliard cubic metres in 2002.

The further development of Stockman gas and Prirazlomnoye oil fields, the hydrocarbon resources of the polar part of Timano-Pechora province and the sea shelf, and a favourable investment climate, should in both mid-term and long-term prospects allow the Russian part of The Barents Region to become one of the most important regions in oil and gas exploration and production.

According to the Russian Ministry of Energy, the degree of exploration extent of the initial total oil reserves in the region is believed to be 39.6% (for the sea shelf fields it is 27.8%), which, correspondingly, points to real opportunities of increasing the region's oil production potential and discoveries of new oil fields. It, first of all, concerns the territory of the Nenets Autonomous Region and the Arctic shelf, having high oil and gas potential.

The degree of depletion of the discovered oil reserves for the whole Russian part of the Barents Region is on the level of 26% (in the Nenets Autonomous Region it is 4%). This means the major part of the explored oil reserves in the Nenets Autonomous Region has not yet been developed. First of all, it is the Kolvinskiy mega bank oil fields, and oil fields of the western and central parts of the Khoreyverskaya basin.

The degree of exploration extent of the initial total gas reserves in the region is approximately 44% (including the sea shelf areas it is 15%), and the degree of depletion of discovered gas reserves is 39% (in the Nenets Autonomous Region it is 0.6%).

The volume of gas reserves onshore is rather low – 645 milliard cubic metres. The main prospects in gas production are based upon the development of the Arctic shelf.

According to the Russian Ministry of Energy, the oil and gas quality analysis in the Russian part of the Barents Sea can be summarised as follows. More than 60% of oil reserves are difficult to recover. Oils of the province are light with from 0.05% to 2% sulphur content. Low and medium sulphur oils comprise 80% of the industrial reserves and 98% in the production. Finally, high-viscosity oils (above 30 cP) comprise no more than 17% of the proven reserves and predominate in the oil reserves in the Republic of Komi.

About 15% of stocks are located in hard-to-reach reservoir compartments and their extraction comprises

Production area	Oil (million tons)	Gas (milliard m³)
Nenets Autonomous Region	819	484
The Republic of Komi	493	161
Adjusted sea shelf areas	62	2800

Table 3.1 Explored oil and gas reserves in 2002 (Source: Ministry of Energy of Russia)

24% of the total production in the region. In addition, most of the oil and gas fields belong to multi-product reserves. On-site associated products are dissolved gas, sulphur, condensate, ethane, propane, butane and helium.

Further on we give more detailed descriptions of the oil and gas reserves in the Nenets Autonomous Region, the Republic of Komi and the Arctic shelf.

3.1.1 Nenets Autonomous Region

According to the Russian Ministry of Nature Resources, there are 77 discovered oil and gas fields in the territory of the Nenets Autonomous Region, among them: 65 of oil; 6 of gas, oil and condensate; 4 of gas and condensate; 1 of gas; and 1 of oil and gas. About half of the hydrocarbon fields in the region are licensed for development.

The largest hydrocarbon field with the reserves more than 30 million tons each are Toraveyskoye (oil), Kharyaginskoye (oil), Naulskoye (oil), R.Trebsa (oil), A.Titova (oil) and Southern Khychulskoye (gas and oil).

By the year 2002, 34.5 million tons of oil were extracted in the Nenets Autonomous Region. The degree of depletion of the oil fields was 1%; initially extractable reserves for 1 types were 4.2%. 21 oil fields have been prepared for development with a total of extractable reserves of C1 oil at 326.5 million tons.

Five oil fields with 50 million tons of C1 oil (the largest ones Northern Khosedayusskoye with 22.2 million tons, and Tedinskoye with 17.4 million tons) are located in the central part of the Khoreyverskaya basin. These are more remote from the central oil fields along Sorokin shaft (five fields with total C1 oil stocks of 140 million tons; among them the two largest ones are Naulskoye and Toraveyskoye).

Oil reserves in newly discovered fields (C1) have been proven at 45 locations amounting to 264.7 million tons. The discovered oil fields of the Nenets Autonomous Region represent a sufficient potential for production development. That is especially the case for oil fields in the Northern part of Kolvinskiy mega bank, as well as adjoining areas of the Ardalinskoye oil field, which is being developed in western and central parts of the Khoreyverskaya basin.

The largest part of the probable oil resources are concentrated in Khoreyverskaya (374 million tons or 32%), Varandey-Adzivinskaya (31%) and Pechora-Kolvinskaya (18%) oil fields. In addition, Valozemelsko-Kolguevskiy area oil and gas fields, including the Kolguev Island, represent a considerable production potential. By the year 2002, there were a

Figure 3.1 Oil and gas fields in the Barents Sea and in the Timano-Pechora province.

Figure 3.2 In 2002, the proven stocks in Nenets Autonomous Region were estimated to 819 million tons. Lukoil, one of the big private petroleum companies in Russia, is heavily involved in this region. This is one of their drilling sites on the tundra.

total of 90 prospective areas for oil extraction in Nenets Autonomous Region, and the average square of one area was about 30 km^2.

C1 non-associated gas reserves in the Nenets Autonomous Region have been proved on 12 hydrocarbon fields. One gas condensate field is in development, but only insignificant quantities for Naryan-Mar communal needs are extracted. Out of these 12, 9 of the fields are prepared for development. The main gas condensate reserves are concentrated in four major gas fields (Korovinskoye, Kumzhinskoye, Vanevisskoye and Layavozhskoye).

3.1.2 The Republic of Komi

The extractable oil reserves in the Republic of Komi are estimated to be 1.6 milliard tons, while the amount of non-associated gas is estimated to be 1000 milliard cubic metres.

By the year 2002, a total of 407 million tons of oil and 403 milliard tons of gas have been extracted in the Republic of Komi. The average degree of depletion of hydrocarbon reserves in the Republic is approximately 20.0% for oil, and 27.3% for gas. The highest degree of depletion of oil and gas fields is in the areas of intensive development. It reaches 47.5% in Velyu-Tebukhskoye oil field, 47.4% in the Kharyaga-Usinskoye oil field and 45.0% in Michayu-Pashnoinskoye oil field. The corresponding figures for gas are: 66.3% in the Vukhtylskoye field and 57.4% in the Omra-Soivinskoye field. The average degree of depletion of initially extracted reserves (type 1) in the Republic of Komi amounts to 45.2% for oil and 71.4% for gas.

The state register in Republic of Komi included 133 proven oil and gas fields, among them 113 of oil, 35 of gas, and 10 of gas condensate. Small size hydrocarbon fields (with stocks up to 10 million tons) comprise 81% of the available reserves. 12 fields range from 10 to 30 million tons while only 8 fields have reserves of more than 30 million tons. The major oil and gas fields are: Usinskoye with initial extractable reserves of 226.25 million tons of oil, Yaregskoye with 131.8 million tons of oil, Verkhnevozeyskoye with 53.3 million tons of oil and Vozeyskoye with 135.7 million tons of oil and gas.

More than 70% of industrial gas reserves in the Republic of Komi are located at the currently developed fields. The major part of the remaining oil reserves are located at the Vuktylskoye oil field, where extraction volumes are decreasing and where all the possibilities for increase have already been used. Other hydrocarbon fields in the Republic of Komi are either too low in reserves or too far from the major transportation routes.

Figure 3.3 In 2004 the state register of the Republic of Komi includes 131 oil, gas and gas condensate fields. The oil field in the picture is located in the taiga in the Usinsk Region.

Figure 3.4 The Murmanskaya platform during a drilling operation in the Pechora Sea in September 2003. The platform is owned by Arktikmorneftegazrazvedka, which has its base in Murmansk. The platform Prirazlomnaya in the Pechora Sea is the first to do commercial operations in areas that are covered by sea ice half of the year. According to plan the Prirazlomnaya platform will be put into operation in 2005.

In the Republic of Komi 54 oil and gas fields are under industrial development, comprising 37 of oil, 11 of gas, and 6 of gas condensate. Only 5 more oil fields (Southern Lyzhskoye, Northern Kozhvinskoye, Srednemakarihinskoye, Pashorskoye and Verkhne-Grubeshorskoye) have been prepared for development, while other hydrocarbon fields are state registered as being explored.

The extractable oil reserves (C1) are allocated on 94 explored sites and constitute 130.2 million tons where the average reserve of the oil fields is less than 1.5 million tons.

Thus, the explored oil fields do not represent a considerable reserve for oil production. According to the Russian Ministry of Energy, the prospective extractable oil reserves in the Republic of Komi are estimated to be 1.0 milliard tons.

A negative factor for this area is a low concentration of the resources. It is predicted that the overwhelming number of currently discovered hydrocarbon fields will be in the small size range (less than 10 million tons).

3.1.3 The Arctic Shelf

Russia's sea area covers 6.3 million km^2 that corresponds to approximately 21% of the World Ocean surface. At least 4.3 million km^2 of this area are the sea shelf, and 0.4-0.5 million km^2 of the deep-water areas are expected to have good prospects in oil and gas discovery. More than 50% of this area (2.2 million km^2) is located in the Western Arctic.

The general level of geological studies and available data for the Western Arctic shelf is much lower than for the well-known marine oil-and-gas areas as the North Sea, the Gulf of Mexico, the West African shelf, and others.

3.1.4 The Barents and Pechora Seas

As a result of the geological exploration in the sea areas 11 new hydrocarbon fields have been discovered, including 5 in the Barents Sea and 6 in the Pechora Sea. These oil and gas fields represent a total of about 4.5 milliard tons of comparison fuel, including 360 million tons of oil. According the Russian Ministry of Energy, the initial extractable reserves in the Russian part of the Barents and Pechora Seas shelf amount to 27.6 milliard tons of oil equivalent, including 2.1 milliard tons of oil.

In the disputed zone of the Barents Sea the initial extractable reserves are estimated to be 6.4 milliard tons of oil equivalent, including 5800 milliard cubic metres of gas and 0.4 milliard tons of oil.

3.1.5 The Kara Sea

In the basin of the Kara Sea, there are three discovered gas and condensate fields. These reserves constitute approximately 8 milliard tons of oil equivalents, including up to 220 million tons of oil and gas condensate.

According to the Ministry of Energy the initial extractable resources of oil equivalent in the Kara Sea reach nearly 54 milliard tons, including at least 11.5 milliard tons of oil and gas condensate. Maximum extraction volume of gas on the Southern Kara fields can exceed 100 milliard cubic metres a year.

3.2 OIL PRODUCTION

For both 2002 and 2003, the annual gain in oil production in Russia exceeded 110 million tons (plus 37% of 1999 level). In 2002, 378 million tons of oil were extracted, in 2003 the production level reached 408 million tons – the highest level since 1992, and in 2004, 459 million tons of oil were extracted. According to the Russian Ministry of Nature Resources, the expected level of extraction in 2004 is predicted to be 450 million tons. In 2010, the yearly oil production level may reach 490 million tons, and in 2020 – 520 million tons.

The oil companies Lukoil, Yukos, TNK-BP, Surgutneftegaz, Sibneft, Tatneft, Rosneft and Bashneft are the largest in oil extraction volumes and capitalisation levels. For several decades, Western Siberia has been the major centre of Russia's oil industry. More than 53% of the oil reserves are located in this region, and since the mid 1980s this region produced 67-72% of the Russian oil. According to the results of 2003, the oil production in Western Siberia reached 304 million tons (72.2%).

The oil production level in the Timano-Pechora province increased from 14.7 million tons in 2002 to 20.7 million tons in 2004. In the Republic of Komi 9.6 million tons of oil were produced in 2002, 9.9 million tons in 2003, and 10.2 million tons in 2004. In the Nenets Autonomous Region 5.1 million tons of oil were produced in 2002, 7.4 million tons in 2003, and 10.5 million tons in 2005. According to the regional Administrations of the Republic of Komi and Nenets Autonomous Region the plan for the year 2005 is to extract 10.2 million tons of oil in the Republic of Komi and 12 million tons of oil in the Nenets Autonomous Region.

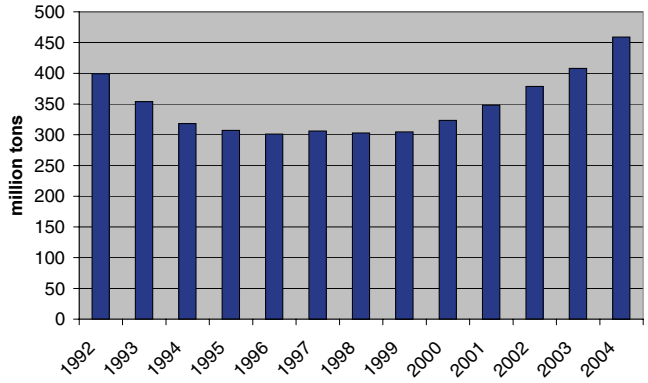


Figure 3.5 Total annual oil and gas condensate production in Russia (Source: Prime-Tass, Transneft)

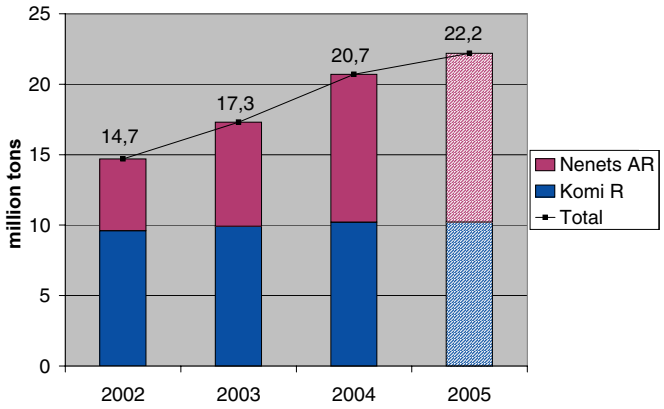


Figure 3.6 Annual oil production in the Republic of Komi and the Nenets Autonomous Region (Source: Administration of the Republic of Komi, Administration of the Nenets Autonomous Region).

3.3 DEVELOPMENT POTENTIAL

During the meeting "Prospects of hydrocarbon resources development in North-West Russia" held in Arkhangelsk in February 2004, the Ministry of Nature Resources of Russia stated that by 2020 the annual production at offshore oil and gas fields of the Barents and Pechora Seas should reach the level of 25-30 million tons of oil and 100-130 milliard cubic metres of gas. Production of oil for the whole period should be 698 million tons (with maximum yearly production of 35-45 million tons onshore and 25-30 million tons in the Pechora and Barents Seas). For gas the corresponding volume should be 140 milliard cubic metres. The increase in hydrocarbon reserves should be 720-910 million tons of oil equivalent. In order to achieve this level of extraction, hydrocarbon research and exploration work must reach the level of 2 million running kilometres of deep drilling, and 111 000 running kilometres of seismic exploration.

3.3.1 The Timano-Pechora province

According to the Russian Ministry of Energy, in the nearest future, the role of the terrestrial oil fields in the Russian part of The Barents Region will change. In 2002, almost two thirds of the extracted oil was produced by the Komi fields, but in 2020, two thirds of the oil production volume will be produced by the oil fields in the Nenets Autonomous Region.

In the Republic of Komi an insignificant production growth is expected for the period 2010-2020, i.e. with the annual volume of 12.9 million tons in 2010 and,

subsequently, a slight decrease down to 11.4 million tons in 2020.

The further development of the Komi hydrocarbon fields will be accompanied by a structural decline of major reserves with increasing number of hard-to-extract fields. This will be followed by increase in production costs as well as use of more advanced extraction technologies.

The estimated oil production in Nenets Autonomous Region in 2010 will be 31.5 million tons and in 2020 it will be 29.0 million tons.

Newly developed and discovered fields will provide the growth in production.

According to the Russian Ministry of Energy, the geological and physical characteristics of the fields, as well as natural and climatic conditions of the area will require highly efficient and environmentally friendly technologies in resource development.

Figure 3.7 In 2010 the estimated oil production in Nenets Autonomous Region will be 31.5 million tons. The oil fields are located on the tundra and in the southern taiga. In these remote areas helicopters are indispensable for transportation of people and equipment.

3.3.2 The Arctic Shelf

The oil extraction on the shelf of the Barents Sea will begin with the start of operations at Prirazlomnoye oil field.

The beginning of the extraction at the licence sites of Arktikshelfneftegaz is planned to begin in 2009 (Medynsko-Vavrandeyskiy area), while Kolokolmorskiy and Pomorskiy blocks will be put in operation in 2011.

By 2013, the oil extraction on all these four sites should reach 12.7 million tons a year, thereafter the production will gradually start decreasing. To keep the hydrocarbon resources exploration production at the efficient level the Ministry of Energy proposed to renew licensing of the Arctic shelf regions.

3.4 THE REGION'S GAS INDUSTRY

Today, three subsidiaries of Gasprom, Sevgasprom, Pechoraneftgasprom and Sevmorgaz are developing gas condensate fields in the Russian part of the Barents Region. Gasprom owns 80% and 62% of Pechoraneftgasprom and Sevmorgaz respectively.

At present, the existing fields have reached the low extraction stage and the degree of depletion of gas reserves is 79.7%.

The Region's biggest hope is the Stockman gas field that will be developed by Sevmorneftegas Company, founded by Gasprom and Rosneft in 2002. The field is located in the central part of the Barents Sea, 550 kilometres off the mainland. It is expected to produce from 60 up to 90 milliard cubic metres of gas a year using different extraction methods. According to the development project of the Stockman gas field (authorised by the Gas Industry Commission on development and use of mineral resources) the annual gas volume from the field after 2020 will amount to 90 milliard cubic metres. From the offshore facilities, gas will be transported to the coast (to the site near Teriberka village) via underwater gas pipeline. The main direction of the projected land gas pipeline is planned to be along the route of Teriberka-Murmansk-Belomorsk-Petrozavodsk-Volkhov with a special line to Vyborg.

The reserves of Stockman gas field in types of A, B and C1 amount to 2536.4 milliard cubic metres.

The prime area for exploration and development of gas reserves is the Arctic shelf consisting of the Northeast shelf of the Barents Sea, the shallow part of the Pechora Sea shelf, the Priyamal shelf of the Kara Sea, the Ob and Tazov Bays.

According to Gasprom estimations, the gas reserves in the region (excluding Stockman gas field) can provide the total production of 10 milliard cubic metres of gas and 300 000 tons of gas condensate by the year 2020.

4. Oil transport

The description of the transport system in Russia is based on the reports and the documents of the Ministry of Transport of Russia, and in particular, on the federal programme "Strategy of transport development in Russian Federation for the period until 2010". In the articles about railways we published information from the Russian Railways Company. In the articles about rivers, lakes and canals we used data from the internet portal Infoflot. News published by the SeaNews and Logistics information portals were used in the articles about sea transport. Most of the description of the oil pipeline system is the information published by Transneft.

The descriptions of the oil loading terminals are based on the first report "Oil transport from the Russian part of the Barents Region", and up-dated using information of press releases and news of the companies and operators, environmental authorities, regional information agencies, and local newspapers. The information presented in the articles about oil loading terminals in the Russian part of the Barents Region was verified by the Arctic, Arkhangelsk and Nenets Specialised Marine Inspections of the Russian Federal Service on Nature Resources Use Control.

In section 4.2.5, the Norwegian Armed Forces present figures on oil transportation from Northwest Russia, and information on Norwegian systems for coast emergency response action. The Norwegian Armed Forces are responsible only for the information given in his section.

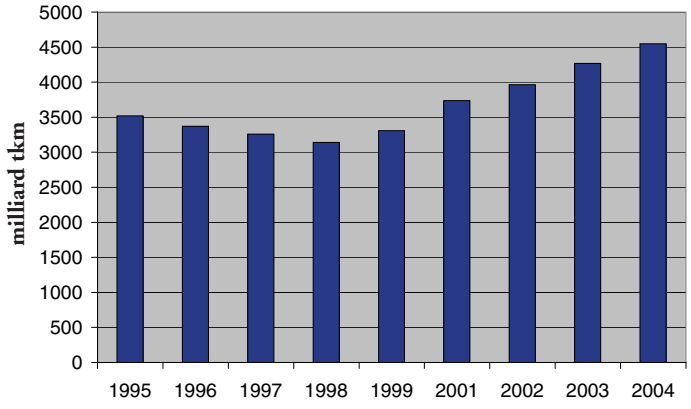


Figure 4.1 The total annual transportation turnover in Russia from 1995 to 2004 (Source: Prime-Tass)

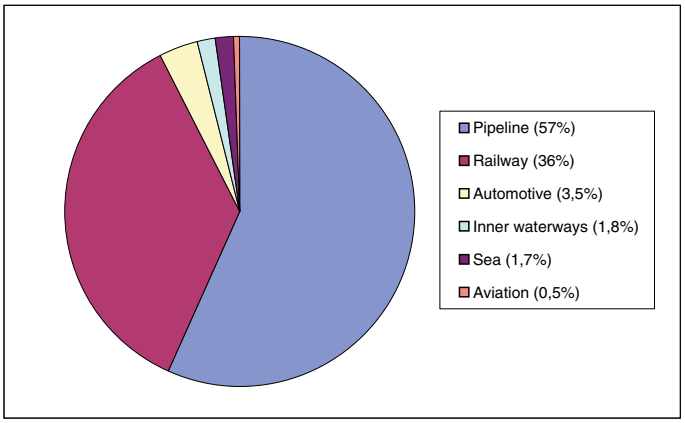


Figure 4.2 The proportions of freight types in 2003 in turnover (tkm). (Source: Prime-Tass, Russian Railways)

4.1 THE TRANSPORT SYSTEM IN RUSSIA

Russia has its most advanced transportation infrastructure in the European part of the country. The total annual transportation turnover of Russia including pipelines, railway, automotive transportation, inner waterways and sea shipping and aviation, amounts to more than 4500 milliard ton kilometres.

The significance of various transportation types is determined by their share in the total transportation flow. The major part of the transport activity in Russia belongs traditionally to pipelines and railway transportation.

The volume of export-import cargoes in Russia in 2003 was more than 600 million tons and the volume of export exceeded the import by almost 1.5 times. The major part of exports from Russia conisists of fuel, including more than 200 million tons of export oil and oil products, while the oil production in Russia was at the level of 400 million tons a year.

In 2004, the Russian Ministry of Transport worked out a "Strategy of transport development in the Russian Federation for the period until 2010". According to this strategy the volume of export-imports in 2010 is expected to increase 3 times compared to the volume in 2003. The main trend of export infrastructural development is the creation of sufficient oil storage and loading capacities in the Russian seaports for oil shipments directed to both traditional and new markets.

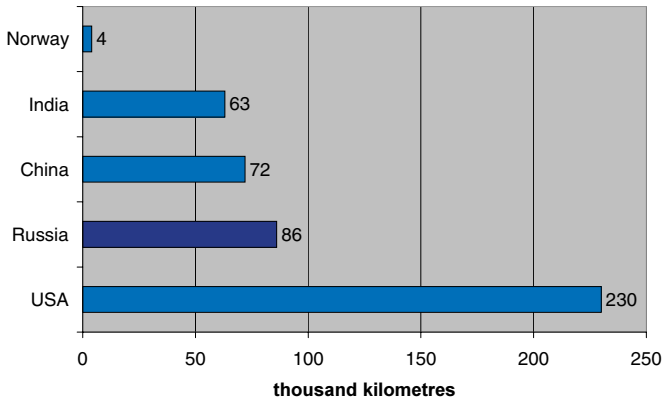


Figure 4.3 Operation length of railways in different countries (Sources: Russian Railways and Norwegian National Railway Administration)

4.1.1 Railways

Railway transportation is a main means of commercial transport in Russia. Primarily, it can be explained by the country's geographical features. The length of railway tracks puts Russia in second place in the world after the USA. Operational length of the Russian railways is 86 600 kilometres, which comprises 11% of the world's total extent of railway tracks.

About 1 milliard tons of cargo a year are transported by railway, where the oil share of this volume of goods is about 18%.

In Russia, 85% of the railways are located in the European part of the country. This is accounted for by historical reasons as the economy of Russia is mainly concentrated in the European part. Both the major communication networks and freight traffic in Russia were built around the country's export-imports to the west and south where large ports and the main trade partners were located.

In the period from 1837 to 1890, Russia built a railway network in the European part of the country. In 1837, the first railway was built to connect Saint Petersburg to Tsarskoye Selo. Then, into 1851, Moscow-Saint Petersburg railway was put in operation. Today this route is the Russian railway's fastest line, and is an important part of the major communication channel between Moscow, Saint Petersburg and Murmansk on the October Railway.

The October Railway

The October Railway goes from Moscow through Tver, Pskov, Novgorod, Leningrad, Vologda and Murmansk

Figure 4.4 The October Railway operates from Moscow and Saint-Petersburg, north through Karelia to the city of Murmansk and westwards to the town of Nikel close to the Norwegian border. The railway line has an operational length of 10 143 kilometres and it carries more than 100 million of tons annually. The October Railway delivers oil products to Vitino and to Murmansk.

Regions and the Republic of Karelia. It has the operational length of 10 143 kilometres and carries more than 100 million tons of cargo a year. The line between Pechenga and Liinahamari in Murmansk Region is the most northerly working land-based railway in the world (up until 1997 this record belonged to Kirkenes). At present the increase in the freight traffic going north along the October Railway is mainly connected to crude oil export. From 1995, the export oil was delivered to the Beloye More station (Vitino port); since 2004, the oil has been carried all the way to the port of Murmansk. In 2003, the railway delivered to Vitino port almost 6 million tons of export oil (about 100 000 railway tank cars[1]), and in 2004, more than 7 million tons of export oil were sent to Vitino and Murmansk ports. However, this increase in freight traffic led to a minor crisis. At the end of November 2004, due to the problems with unloading freight, the sidetracks near the seaports were jammed with 6600 cars. In particular, in Murmansk commercial port there were 1100 cars with oil and 1376 cars with coal awaiting unloading.

[1] One rail tank car can carry 65 tons or 73 m^3 of cargo. One cargo train usually consists of about 50 cars.

In November 2004, at the joint meeting, the Russian Northwest port authorities and the October Railway management discussed the prospects of establishing a unified logistics centre for Northwest Russia with a head office in Saint-Petersburg. This centre should solve problems with unloading of freight trains in North-western ports in both mid and long-term prospects. A local logistics centre is also created in Murmansk.

According to October Railway Department, the expected growth of freight at Murmansk railway junction for the period 2010-2015 may reach 40 million tons. The planned modernisation of the railway's northern line (both tracks and service facilities) will be carried out by the October Railway department together with the interested parties of railway customers and carriers. This includes, in particular, Tangra Oil Company which is also participating in the reconstruction of the Beloye More station and the Murmansk junction.

The October Railway joins the Northern Railway on the borders of the Republic of Karelia and Arkhangelsk Region, Tver and Yaroslavl Regions, and in Vologda Region.

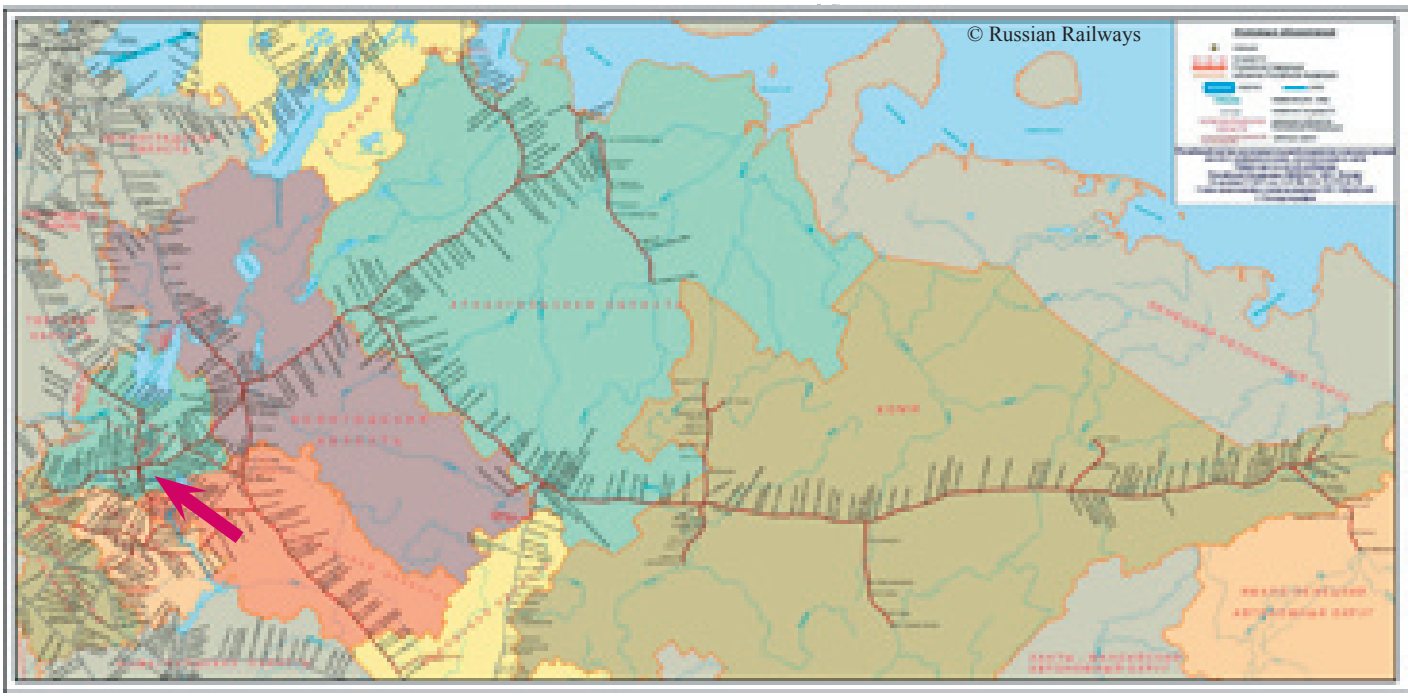


Figure 4.5 The Northern Railway has been operating from Moscow to Arkhangelsk since 1868. The operational length of the railway is 8508 kilometres. In 2004, more than 70 million tons of cargo was transported along the Northern Railway. The trunk pipeline from Western Siberia passes through Yaroslavl (see arrow) north of Moscow. This is a key location for railway transports of oil north to the Barents and White Seas. This line delivers petroleum to Arkhangelsk and there are plans to start deliveries to Severodvinsk and Onega.

Figure 4.6 In 2004 more than 7 million tons of export oil was sent to Vitino and Murmansk by the October Railway (Moscow-Murmansk line). In 2010-2015 the expected growth of freight by rail to Murmansk will be 40 million tons a year. This train with oil tank cars was passing Kandalaksha in September 2004.

The Northern Railway

In 2003, the Northern Railway was 135 years old. The Northern Railway goes along the oldest animal-drawn track from Moscow up to Arkhangelsk, which connected the north of the country with its central provinces in the days of Ivan the Terrible. Nowadays, the Northern Railway runs through Northern and North-eastern Russia, through the territory of Yamal-Nenets Autonomous Region, Republic of Komi, Arkhangelsk, Vologda, Kostroma, Ivanovo and Yaroslavl Regions. The Northern Railway has a favourable geographical position as it passes through the location of the major pipeline junction; the Ukhta-Yaroslavl-Kirishi pipeline joins the pipeline that goes through Surgut-Yaroslavl-Polotsk. The Baltic pipeline system originates in Yaroslavl.

The operational length of road is 8508 kilometres and carries more than 70 million tons of cargo a year, where crude oil and oil-related products reach the amount of 18 million tons a year.

In 2004, the Northern Railway delivered about 3.4 million tons of export oil through the port of Arkhangelsk. The plans for modernisation of the present railway infrastructure in the Arkhangelsk Region are associated with business offers from Rosneft-Arkhangelsknefteprodukt Company, Tatneft-Arkhangelsk, ARM Nefteservis concerning oil transportation to the ports in Arkhangelsk, Severodvinsk and Onega of the amount of 12.5 million tons of oil and oil products a year.

The Northern Railway signed in 2004 a contract of intentions with Arkhangelsk Regional Administration and cargo operators on cooperation in reconstruction work on some parts of the railway in order to expand the freight of oil to the ports of Arkhangelsk and Severodvinsk.

4.1.2 Canals, rivers and lakes

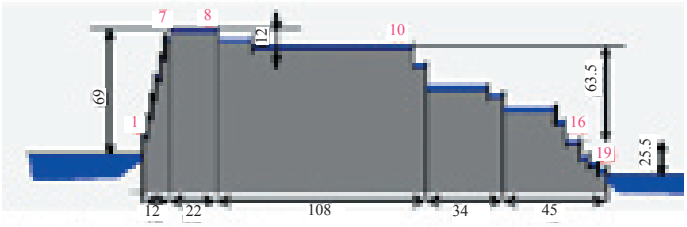
The length of the rivers used in Russia for navigation on a regular basis comprise 108 000 kilometres. A freight turnover of the river transportation forms about 2% of the total goods turnover in Russia.

The largest rivers of Siberia and the Far East are the Ob, the Irtysh, the Yenisei, the Lena, and the Amur Rivers. All these rivers serve the oil-and-gas industrial complex. In the European part of Russia, the major navigable river is the Volga, which incorporates two other water routes: the Volga-Baltic and the Volga-Don canals. The total extent of the Volga-Kama basin is 3500 kilometres. The annual turnover of goods amounts to 50% of the total river transportation turnover of Russia.

In the Russian part of the Barents Region the main navigable river is the Northern Dvina that carries cargo to Arkhangelsk and Kotlas. The Pechora River freights goods to Naryan-Mar and the Nenets Autonomous Region. The Ladoga and Onego lakes also have significant economic value. The White Sea-Baltic canal plays an important role in cargo transportation to the north.

The White Sea-Baltic canal

The White Sea-Baltic canal was opened for navigation in August 1933. The construction of the canal began in 1931 on Stalin's initiative. It was built by 280 000 prisoners (more than 100 000 people died during the construction period) armed with wheelbarrows, sledgehammers and axes. The White Sea-Baltic canal



Horisontal line - length in kilometres
Vertical lines - heigth in meteres
Red numbers - water lock number

Figure 4.7 The profile of the White Sea-Baltic canal.

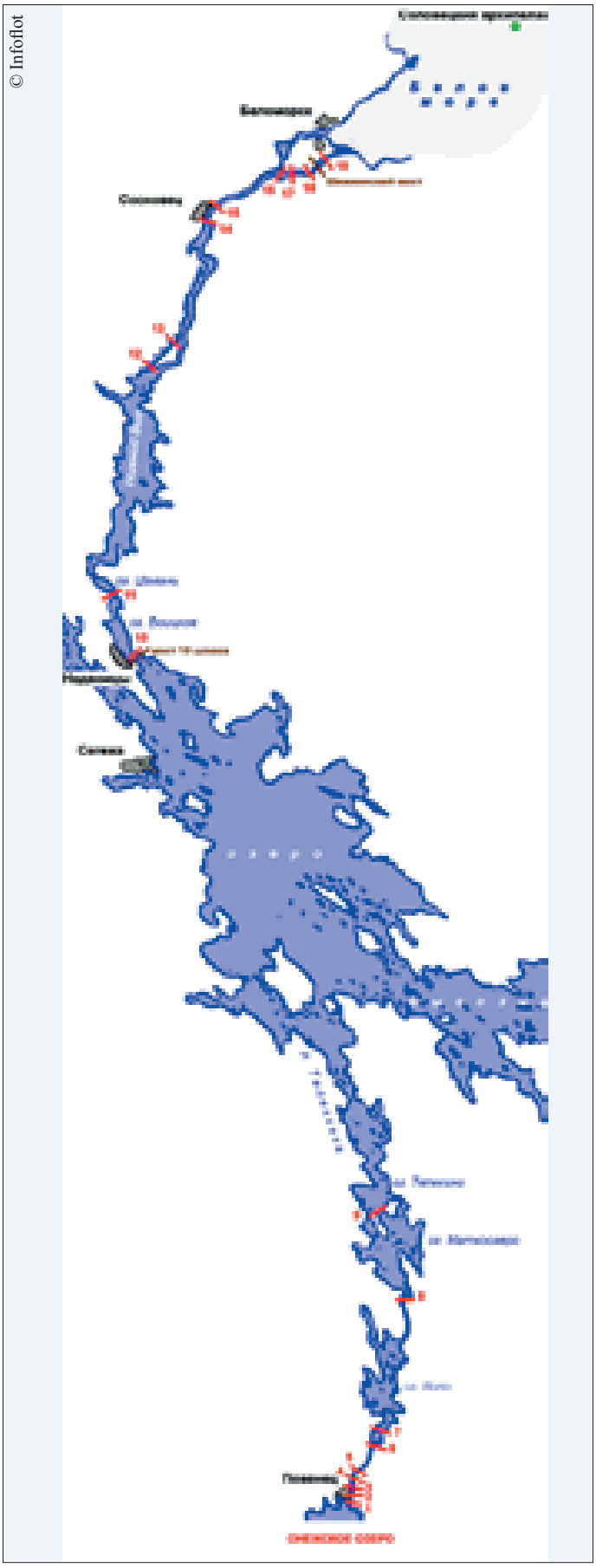


Figure 4.8 Map of the White Sea-Baltic canal from Onega Lake to Belomorsk. Red numbers indicate the 19 water locks.

became the first example of reconstruction of internal waterways in the Soviet Union. The canal contains 19 water locks (13 of them are two-chambered), 15 levies, 49 dams, 12 floodgates. And while the Panama canal of length 80 kilometres was under construction for 28 years, and the Suez canal in length of 160 kilometres was built in 10 years, the White Sea canal of 227 kilometres with 100 hydraulic installations was built in the rocky ground in 20 months. The segment of artificial channels is about 43 kilometres, and the share of lakes, water basins and backwater rivers is 184 kilometres. In due time the waterway worked day and night, the navigable conditions were the best in the USSR: beacons, buoys, gate signs were well maintained, and the canal transported about 1 million tons of freight a year. In the 1990s, The White Sea canal practically went out of use.

The first delivery of oil by the White Sea-Baltic canal took place in August 1970. Then the river-sea tanker *Nefterudovoz-3* of Volgotanker Company passed hundreds kilometres by Volga River, the White Sea-Baltic canal, and the White Sea and moored to the pier of Kandalaksha town in the Murmansk Region. It was the first voyage above the Polar circle in the history

Figure 4.9 *Nefterudovoz-3* is one of seven oil-and-ore tankers built during 1968-71 for transport on rivers, lakes and canals. This one was the first to go to the Russian Arctic. In 1970 *Nefterudovoz-3* delivered oil to the town of Kandalaksha in the White Sea. Here the ship is moving out of water lock 16 near Belomorsk on the White Sea-Baltic canal in July 2003.

of Volgotanker Shipping Company. In the 1970s, the delivery of each thousand tons of fuel cargo to the Murmansk and Arkhangelsk Regions by water route instead of railway led the Soviet state to save 2000 RUR (about 2000 USD).

During navigation in 2003, Volgotanker Company delivered through the canal 220 000 tons of fuel oil, which were loaded into sea tankers in the Onega Bay of the White Sea for export. In 2004, the transportation of export oil through the White Sea-Baltic canal was halted due to the fuel oil spill accident during the transshipment in the Onega Bay in September 2003.

4.1.3 Sea transportation

The first seaport of Russia, Arkhangelsk, celebrated its 420th year anniversary in 2004.

Today, the backbone of sea transport in Russia consists of 44 commercial seaports, 146 private wharfs, 10 large state and corporate sea shipping companies and about 300 private sea shipping operators.

The freight turnover of the Russian seaports has grown steadily during the recent four years. In 2001, the turnover was 201 million tons, in 2003, it was 285 million tons, and it reached the level of about 340 million tons in 2004. Oil and petroleum products form up to 50% of the sea cargo.

After the fall of the USSR, the sea transportation capability for international trade and internal transport sharply deteriorated and the development of the Northern Sea Route was given a greater priority. In particular, this concerned the development of the seaports in the Russian part of the Barents Region. In 1990 about 7 million tons of cargo was transported by the Northern Sea Route, while in 2003 the transportation volume was only 1.7 million tons.

In the "Strategy of transport development in the Russian Federation for the period until 2010", great emphasis is given to the increase of seaports' capability. According to the Ministry of Transport, the capacity of the Russian ports in 6 years perspective should be increased by 370 million tons a year, and the share of domestic seaports in processing the Russian and transit cargoes should reach 90%. During this period, there should appear a number of modern multimodal logistics centres with total capacity of more than 70 million tons. The projected modernisation of the Arctic transportation system should ensure Russia's strategic control of the Russian Arctic Regions, steady export along the northern sea communications, as well as promoting the development of natural resources in the northern territories.

Figure 4.10 Small ice classed oil tankers operate the whole Northern Sea Route (in this report from Tiksi in the Eastern Siberia, the Laptev Sea to Murmansk in the Barents Sea). During winter these small tankers operate the ice covered ports of Varandey in the Pechora Sea and Talagi at Arkhangelsk and Vitino in the White Sea. This tanker is assisted by icebreakers.

By 2010, the volume of cargo passing through the Russian seaports should increase to 540 million tons a year. The tonnage of the Russian controlled fleet should increase to 16.8 million tons, and transit transportation through the Russian territory are to nearly double, that is, to reach the amount of 80 million tons a year.

In order to implement these plans, Russia is building new nuclear icebreaking and tanker fleets of a new generation. In 2004, the total tanker fleet of Russian companies as Sovkomflot, Novoship, Lukoil-Arctic-Tanker, Primorsk Shipping Corporation and Murmansk Shipping Company consisted of 155 vessels with total deadweight more than 8 million tons. During the next three years new ships are to be built with total tonnage of 3.4 million tons.

Development of the port capacity in the Russian part of the Barents Region is directly connected to the increase of oil and oil products exports. In 2004, the seaports of Arkhangelsk, Vitino and Murmansk, directly or through the offshore terminals in the Kola Bay exported about 11 million tons of oil (in 2002 it was 4 million tons, and in 2003, 8 million tons of oil). By 2010, the volume of oil exported to the western market along the Northern Sea Route can increase to 40 million tons, and by 2015, it can reach 150 million tons a year following the construction of oil pipelines up to the coasts of the Barents and Kara Seas.

4.1.4 Trunk pipelines - main transport routes for Russian oil

About 95% of oil extracted in Russia is transported by trunk oil pipelines. All main pipelines are operated by state owned Transneft founded by the Government of The Russian Federation.

Trunk oil pipelines of Transneft

The history of the pipeline transport in Russia (former USSR) is more than a century old, and started with the industrial development of Baku and Grozny oil fields. At the start of pipeline transportation, a famous Russian scientist Dmitry Mendeleyev said that construction of the pipeline would ensure a reliable basis for oil industry development and would open the world market for Russian oil. The first Russian field pipeline Balakhany-Baku (10 kilometres long) was built in 1878, and that pipeline became the ancestor of the giant network of trunk pipelines that are operating nowadays. By the end of 1914, the total length of the Russian oil and oil product pipelines was 1278.7 kilometres. In comparison, at the same time the total length of the pipelines in the USA was 14 000 kilometres, including 7000 kilometres of trunk pipelines.

Figure 4.11 The Baltic Pipeline System that starts in Yaroslavl and ends in Primorsk (Gulf of Finland) is the most prioritised project of Transneft.

Figure 4.12 Construction of the Baltic Pipeline System with a projected capacity of 62 million tons a year.

By 1987, 94 000 kilometres of oil and oil products trunk pipelines were built and commissioned in the USSR. The pipelines were managed by the Central Department for Oil Transportation and Supplies (Glavtransneft). Glavtransneft was responsible for oil supplies to exports. In late 1991, the USSR disappeared from the map of the world. Fifteen new states had distributed between themselves common property, including the oil pipelines. The universal oil pipeline system was left only in Russia. In some of the countries, only part of the trunk pipelines was left. In addition to Russian, other countries were engaged in the Russian oil transit, which was accompanied by complete reorganisation of the oil industry. Glavtransneft was reorganized into the Transneft Company. By that time, Transneft was operating 49 600 km of oil trunk pipelines with diametres 400-1220 mm, 404 pump

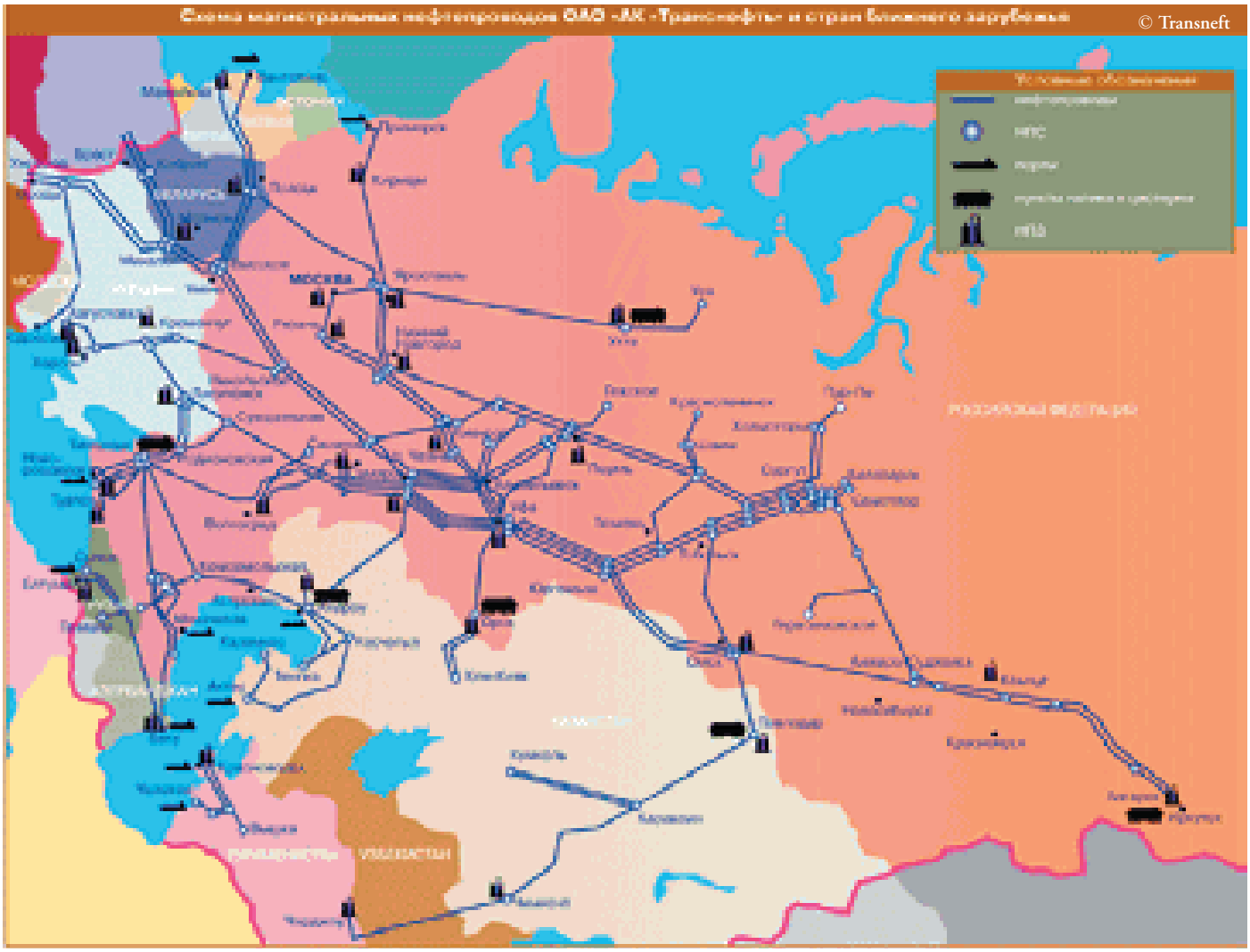


Figure 4.13 Transneft is the owner of the oil trunk pipeline system in Russia and may pipe 476 million tons of oil in 2005, sending 260 million tons for export.

stations and 934 tankers with total capacity 13.2 million cubic metres.

In 2002, Transneft piped 374 million tons of oil. In 2003 414 million tons of oil were piped, of which 208 million tons were exported; in 2004 almost 450 million tons of oil were piped and about 220 million tons exported including transit. In the year 2005 Transneft pipelines can receive 476 million tons of oil and transport for export 260 million tons.

Among the export trunk pipeline construction projects of Transneft there are three to be highlighted: the Baltic Pipeline System; pipeline East Siberia – The Pacific Ocean; and the pipeline Western Siberia – The Barents Sea coast.

The project of construction and development of the Baltic Pipeline System (BPS), with the capacity of 62 million tons a year, is now the Transneft project with highest priority. The first line of BPS and the port of Primorsk with the capacity 12 million tons of oil a year was put into operation in December 2001. In November 2003, the capacity of the export corridor was increased up to 30 million tons, in February 2004 it was 42 million tons, and by the end of the year 2004 reached 50 million tons. In December 2004, the Russian Government adopted the suggestion of the Ministry of Industry and Energy and Transneft to increase the capacity of BPS to 60 million tons a year.

Transneft suggest stage-by-stage implementation of the project of building the pipeline East Siberia – Pacific Ocean, with the route Taishet-Skovorodino-Perevoznaya, and the capacity of 80 million tons a year. In the course of the first stage it is planned to construct

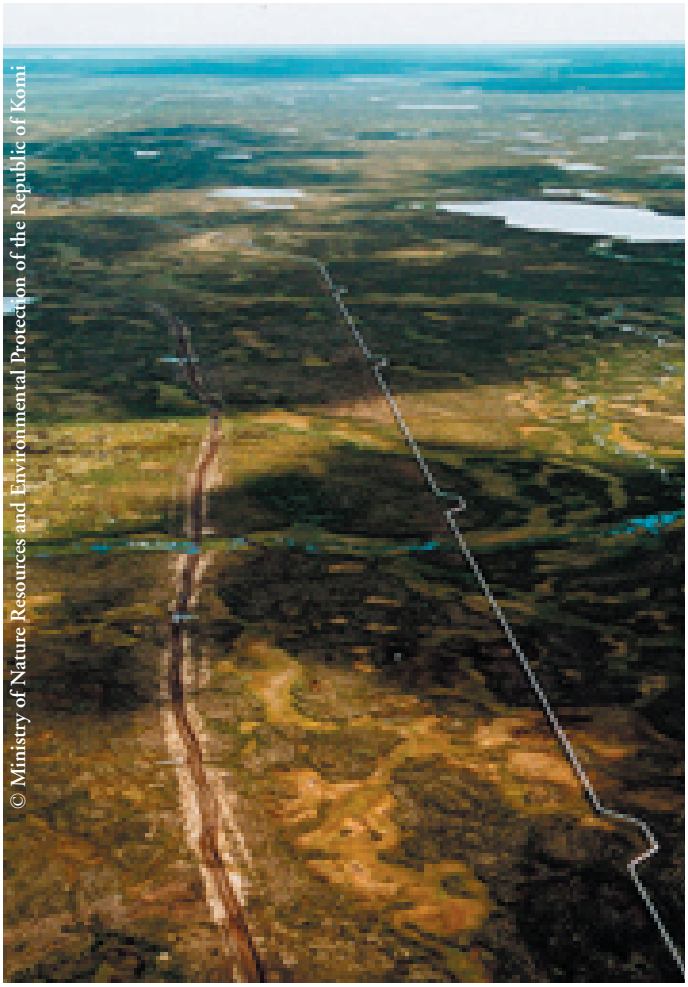


Figure 4.14 The pipeline starting north in the Timano-Pechora oil-and-gas province, going south. Recently a new reloading facility from trunk pipeline to railway was established in Privodino near Kotlas in Arkhangelsk Region. The rail tank cars go north to the Talagi terminal where the oil is reloaded into small tankers. The tankers shuttle between Talagi and *Belokamenka*, the big floating terminal in the Kola Bay.

the pipeline to Skovorodino (Chinese border). Regarding pipeline capacity, this will amount for the first stage to 30 million tons, and practically all the oil eastwards will be transported to China.

Oil pipeline Western Siberia – The Barents Sea coast

In November 2002, the four largest Russian oil companies Lukoil, Yukos, TNK and Sibneft signed the "Memorandum of Mutual Understanding" on the development of an oil pipeline system via the oil loading terminal in the area of Murmansk. Later Surgutneftegas also joined the consortium. The companies planned to

Figure 4.15 In 2002 the four largest Russian oil companies Lukoil, Yukos, TNK and Sibneft agreed on an export pipeline to the ice free area of Murmansk with a capacity of 80-120 million tons a year. Two different proposals were put forward, a 3600 kilometre pipeline around around the White Sea or a 2500 kilometre pipeline crossing the White Sea (yellow lines). Transneft, the Russian trunk pipeline monopolist, plans to construct 1800 kilometre pipeline (red line) ending near Indiga in the Nenets Autonomous Region.

start construction of the pipeline in 2004 and complete it in 2007. The expected capacity of this pipeline was 80 million tons a year with the perspective to expand it to 120 million tons. The consortium members considered two routes for the projected pipeline: one was Western Siberia-Ukhta-Murmansk 3600 kilometres long, and

Figure 4.16 Private company pipelines hook up the Transneft pipeline network or to an export terminal. This Lukoil pipeline is on the tundra in the Nenets Autonomous Region leading towards the Varandey oil terminal.

the other was Western Siberia-Usa-Murmansk (via the White Sea) 2500 kilometres long.

In January 2003, the Government of the Russian Federation confirmed that all newly built trunk oil and gas pipelines should belong to the state.

In October 2004, Transneft presented to Russian oil producers the declaration of intent for the pipeline construction project. The declaration was also presented at the public hearings held in the Khanty-Mansiysk Autonomous Region, the Yamalo-Nenets Autonomous Region, the Nenets Autonomous Region, and the Republic of Komi. At the same time Transneft proceeded in preparing the Feasibility Study that should take a 10 months period. Giprotruboprovod Company (a Transneft subsidiary and the construction designer) is considering 2 options for the route of the pipeline to the Barents Sea, one via the route Surgut-Usa-the Cape Sviatoy Nos or the Cape Rumianichniy, and another Surgut-Kharyaga-the Cape Sviatoy Nos or the Cape Rumianichniy. According to these plans, the pipeline will begin in the region of Surgut, with a crossing through the northern part of the Urals till the Polar Circle via the main facilities in the region of the town of Usa. The main regions that the crude oil will come from are Western Siberia and the Timano-Pechora oil province.

The oil fields in Western Siberia are planned to ensure annual delivery of 30 million tons of oil via the pipeline system, in this particular direction, and 20 million tons per year from the Timano-Pechora province. The total throughput capacity of the pipeline will be 50 million tons a year. The length of the pipeline will be 1788 kilometres via Usa, or 1878 kilometres via Kharyaga.

4.2 OIL TRANSPORTATION ROUTES IN THE BARENTS REGION

In 2002, more than 4 million tons of Russian oil were exported along the Norwegian coastline, in 2004 the amount increased up 12 million tons, and in 2010 Russia may have the capacity to export up to 150 million tons of oil that way.

The coastal and offshore terminals listed in the table below send oil for export directly or via offshore transshipment terminals in the Kola Bay, Murmansk (location 12, map on page 8). One offshore reloading operation also took place in Bøkfjord, Kirkenes (location 13, map on page 8) in 2002. These transshipment terminals are not listed in the table.

Table 4.1 The oil shipment volumes in the period 2002-2004, capacity in 2004 and expected capacity in 2010 of the terminals. The numbers are in 1000 tons.

	Site	Loaded 2002	Loaded 2003	Loaded 2004	Capacity 2004	Capacity 2010
1.	Tiksi	58’	-	-	100’	-
2.	Dikson	-	-	-	-	30 000’
3.	Ob Bay	110’	220’	240’	300’	3000’
4.	Varandey	200’	400’	560’	1500’	12 500’
5.	Prirazlomnoye	-	-	-	-	7500’
6.	Kolguev	120’	100’	80’	200’	100’
7.	Indiga	-	-	-	-	50 000’
8.	Arkhangelsk	1930’	1500’	3450’	4100’	7200’
9.	Severodvinsk	-	-	-	-	2500’
10.	Onega Bay	-	320’	-	-	5000’
11.	Vitino	2900’	5700’	3700’	8000’	12 000’
12.	Murmansk	-	-	3700’	5500’	18 000’

Figure 4.17 The Pechora Sea in the southeastern part of the Barents Sea. The red circles show the existing and planned oil terminals: (A) Varandey oil terminal (Murmansk Shipping Company and Lukoil), (B) Prirazlomnoye platform (Sevmorneftegaz planned in operation 2005), (C) Kolguev oil terminal (Arktikneft), (D and E) Indiga - planned end terminals for the proposed oil pipeline from the Western Siberia to the Barents Sea coast (Transneft).

We do not state that this amount of oil necessarily will be transported along the Norwegian coast in 2010, but when the plans of the state and private companies for constructing and developing the pipelines, railways and ports are realised, Russia will have the capacity to export up to 150 million tons through the Barents Sea annually. The private oil companies want to export as much oil as possible and they want to build a trunk pipeline to Murmansk. Such initiative came from the big petroleum companies in 2002. The trunk pipeline monopolist Transneft is now considering pipeline to Indiga in the Nenets Autonomous Region instead of the one to Murmansk. At the moment work on the trunk pipeline from Western Siberia to the Barents Sea coast is not proceeding. In the meantime the oil companies, state and private, are going for railway transport of oil to the White Sea and to Murmansk ports. If the plans of the Russian Railways are realised, rail alone can bring up to 40 million tons for export in 2010. In addition, the Varandey terminal will be upgraded significantly, the Prirazlomnoye field will start to deliver oil, and the terminals in the Kara Sea will shuttle oil to the loading terminals in the ice free areas of the Barents Sea. That can give another 50 million tons. With the trunk pipeline or without, the shipping of oil from Russia

Figure 4.18 In 2004, two Lukoil Arctic Tankers *Saratov* and *Usinsk* operated on Varandey. These *Astakhan*-type tankers (20 000 dwt) have bow manifold and take oil from an underwater storage 4.8 kilometres off the coast. Lukoil plans to lay a 12 kilometre pipeline in the seabed to be able to load tankers up to 100 000 tons dwt.

Figure 4.19 The Varandey oil terminal exported 560 000 tons of crude oil in 2004. Lukoil plans to increase the annual export capacity over this terminal to 12.5 million tons.

passing northern Norway on the way to the markets will be significantly increased.

In the following articles we describe existing and prospected oil loading terminals in the Pechora, White and Barents Seas, as well as the terminals in the Kara and Laptev Seas that are developed for shipping Russian oil via the Barents Sea for export.

Figure 4.20 The pipeline system to Varandey. Existing (black lines) and planned (red lines) are shown.

4.2.1 The Pechora Sea

Varandey

The oil loading terminal in Varandey was completed and put into operation in 2000. This terminal is one of the most promising with respect to provide the northbound oil exports from the Timano-Pechora province.

The construction and development of the Varandey terminal have been carried out in stages for a few years. In 2000, the first line of the terminal was completed and the first 10 000 tons of oil were shipped.

In 2002, Murmansk Shipping Company built the second line of the Arctic underwater oil reloading terminal in Varandey. The underwater installation consists of a solid steel structure, 12 metres in diameter, about 3 metres in height, and more than 100 tons in weight. The special mooring unit and the underwater pipeline, which is 4.8 kilometres long, 270 mm in diameter and with the operating pressure of 30 atmospheres, supports an uploading rate of 5000 tons of oil per hour. The loading system is capable of operating steadily under severe cold and rough sea conditions with waves as high as 5 metres.

The oil terminal is connected to the Naryanmarneftegaz oil storage in the port of Varandey that has the capacity of 415 000 cubic metres. The oil stored here is delivered from the northern oil fields of the Nenets Autonomous Region via the local pipeline system.

The terminal is assisted by ice-reinforced tankers of *Astrakhan* type of 20 000 tons deadweight. In 2004, oil was shipped by tankers *Saratov* and *Usinsk* built at Admiralteyskiye shipyards in Saint-Petersburg in 2001 and 2002 for Lukoil-Arctic-Tanker Company. Both tankers are equipped with a bow manifold, which considerably simplifies loading of crude oil in the harsh weather conditions of the Arctic seas.

Oil spill prevention and response services at the Varandey terminal are provided by the Murmansk Basin Emergency and Salvage Department (MBESD). In summer the MBESD specialised vessel *Agat* is on watch during each oil shipment, while in winter acute oil spill prevention equipment is located on the icebreaker *Kapitan Nikolaev*, which is assigned to assist at offshore oil shipment.

In 2002, the Varandey terminal shipped 200 000 tons of oil; in 2003 it increased to 400 000 tons; and in

Figure 4.21 The Lukoil subsidary Arktikneft is responsible for the extraction and shipment of oil from Kolguev. In recent years 80 000 to 100 000 tons of crude oil has been shipped annually from Kolguev, now only in the summer period from June to October.

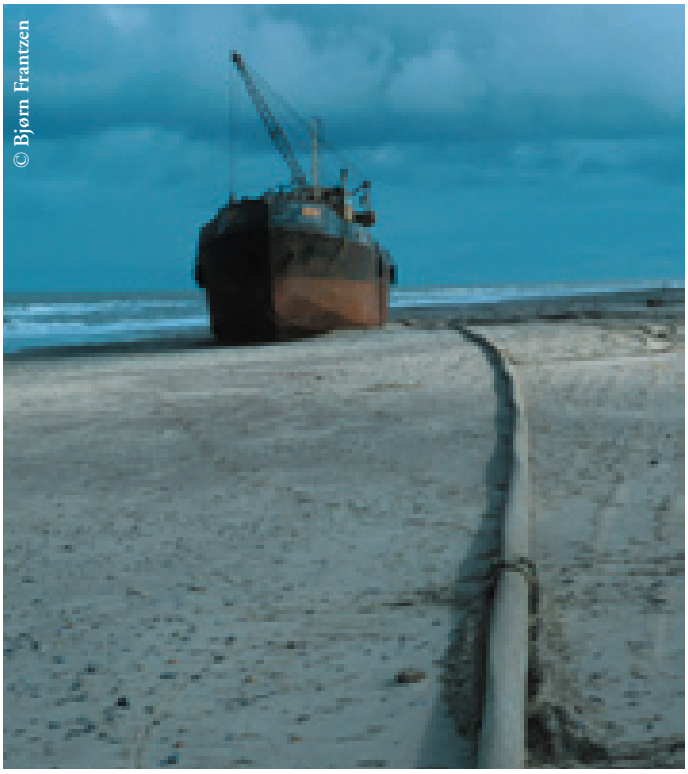


Figure 4.22 In storms ships might be blown ashore. This ship is stranded on the beach close to the Kolguev oil terminal.

2004 to 560 000 tons. Oil is exported via the offshore oil shipping terminal in the Kola Bay.

In 2004, Lukoil Company presented a feasibility report of 12.5 million tons capacity expansion for the Varandey terminal that should be completed in 2007. The whole Northern Territories Project with ConocoPhillips participation will be respectively developed. The territories of the project include Khylchuyuskoye, Southern Khylchuyuskoye, Yareygyuskoye and Inzyreyskoye fields, prospects in the Northern part of Kolvinskiy megashaft and Khoreyverskiy valley. The first drilling within the project is planned for 2005. Among the plans to be completed by the end of 2007 is the construction of a new pipeline from the Southern Khylchuyuskoye field to the oil storage in Varandey. In addition, there are plans to augment Varandey storage facilities and to increase the pumping capacity. There is also a project to lay out a 12 kilometre long underwater pipeline and construct an offshore reloading terminal at the depth of 21 metres. The latter will allow loading oil into the tankers of up to 100 000 tons deadweight.

Kolguev Island

Peschanoozerskoye oil and gas condensate field on Kolguev Island was discovered in 1982. In 1985, the Peschanoozerskoye field was put in testing (pre-production) operation. Arktikmorneftegazrazvedka started the commercial operation of the central part of the field in 1987, about the time that the first oil from the Island was loaded into a tanker. Since the beginning of the industrial operation, Arktikmorneftegazrazvedk a has extracted on the site more than 500 000 tons of oil.

Extraction and shipment of oil on the island were also carried out by a Lukoil subsidiary, Arktikneft Company that was founded in 1998. In 2003, Arktikneft extracted 82 500 tons of oil from the Peschanoozerskoye field. In August 2004, Lukoil decided to sell 100% of its share in Arktikneft's stock. The main part of the share for sale was Arktikneft's assets related to the licensed site at the Peschanoozerskoye oil field. Its potential extractable reserves (AB 1) by the year 2004 was estimated at 7.4 million tons of oil and 1.3 milliard cubic metres of associated gas; in 2 type there were proven to be 4.3 million tons of oil and 826 million cubic metres of associated gas; the daily production volume in 2004 were 220 tons of oil with an increase potential to reach 300 tons by 2005.

Figure 4.23 The Prirazlomnaya platform will be the first commercial oil production platform operating in the Arctic in an area that is ice covered six months a year. According to the plan, the platform will be towed to its position in the Pechora Sea during the summer of 2005 and the drilling will start late the same year. The platform is expected to export maximum 7.5 million tons a year.

Exploration operations on Kolguev Island are being conducted by Argo-Plus Company, a subsidiary of the British Proteus International, which was also interested in buying Arktikneft Company stocks.

The oil extracted at the Peschanoozerskoye field is pumped via the local pipeline into the onshore oil storage. Further on, the oil is loaded offshore via the underwater pipeline into the tankers. Tankers with 35 000-40 000 tons deadweight and with maximum draft of 10.5 metres can be loaded only during the summer navigation period (from June to October) due to the ice conditions. All-year-round shipment of oil from Kolguev is not considered to be cost-efficient because of the heavy ice conditions, the complicated bottom profile, the high depth differential and limited oil reserves on the island.

All oil extracted on Kolguev is exported by 20 000 tons deadweight tankers directly or via the offshore transshipment terminal in the Kola Bay. In 2002, the Kolguev terminal loaded 120 000 tons of oil, in 2003 it loaded about 100 000 tons, and in 2004, 80 000 tons were sent for export. There may be an insignificant increase in the oil shipment from the island in the future.

The oil spill prevention and response services at the oil shipment facilities of the Kolguev terminal are provided by the Murmansk Basin Emergency and Salvage Department (MBESD).

Prirazlomnoye

Prirazlomnoye oil field is the largest one among the proven oil reserves on the Pechora Sea shelf. It was discovered in 1989. Initial geological crude oil reserves (1, 2) of the field are estimated at 231.1 million tons (productive horizon I). The cumulative oil production for the operational period of 23 years should amount to 75 million tons.

Since 2002 the licence for the development of Prirazlomnoye oil field belongs to the Sevmorneftegaz Company founded by Gazprom and Rosneft.

In 2002, Sevmorneftegaz purchased in Norway a TLP Hutton platform, which was previously used in oil extraction in the North Sea, and its top part will be used for a drilling installation at the Prirazlomnoye oil field.

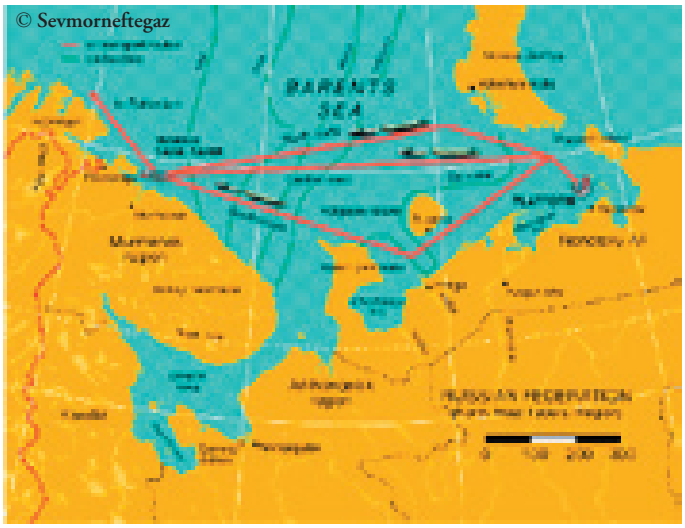


Figure 4.24 The oil from Prirazlomnoye will be sent by shuttle tankers to the Kola Bay and the floating storage *Belokamenka*. Two 70 000 dwt tankers and one to two 20 000 dwt tankers will shuttle between the platform and the Kola Bay. Two multifunctional supply icebreakers will operate together with the platform.

Sevmashpredpriyatiye enterprise in Severodvinsk is now building the caisson for the platform and setting up the drilling unit equipment. The Prirazlomnaya platform was planned to be completed and installed on the location in 2004. Within 2004, Sevmashpredpriyatiye completed and transported into the harbour two sections of the caisson (2 in February and 3 in May), and also in May 2004, the Belgian company Dredging International was contracted to dredge a 13 kilometre long channel from the Severodvinsk harbour.

The platform Prirazlomnaya should be completed and delivered to the field in the Pechora Sea in 2005. The first drilling at Prirazlomnoye oil field is planned for December 2005. The yearly production maximum of 7.55 million tons of oil can be reached in the fifth year of development. The oil extraction operations at Prirazlomnoye will be conducted on the basis of the production share agreement. In August 2004, the Russian Ministry of Industry and Energy sent to the Russian Government the documents for the production share agreement to come into force.

In 2003, Far-East Marine Company (FEMCO) being a structural division of Rosneft-Sakhalinmorneftegaz, won the tender for arranging the oil transportation from Prirazlomnoye oil field and maintenance services for its development. The package deal on establishment and support of the transportation infrastructure includes services of a multipurpose icebreaker, shuttle tankers, a storage tanker, port tows and service vessels, as well as transportation control system. In order to manage the activities on site, FEMCO has founded a subsidiary in Arkhangelsk, Northern Marine Company.

Oil transportation from the oil field will be carried out from the platform all-year-round by shuttle-tankers with 70 000 and 20 000 tons deadweight to the offshore oil storage in the Kola Bay, whence the oil will be exported by regular line tankers. In winter ice-reinforced shuttle-tankers and assisting ice breakers will be made use of for shipping oil from the field.

4.2.2 The White Sea

Arkhangelsk and Privodino

Arkhangelsk was founded in 1584, and historically it was built and developed as a Russian port on the White Sea. Here the Northern Sea Route starts for Russia. Arkhangelsk has an advanced transport infrastructure and plays the important role in "the Northern goods delivery", that is, fuel and supplies for the remote regions of the Russian Arctic.

The Arkhangelsk petroleum storage depot in Talagi is the largest in the Arkhangelsk Region. The owner of the petroleum storage depot is Rosneft-Arkhangelsknefteprodukt. The company was founded on the basis of the Arkhangelsknefteprodukt, the state enterprise established in 1966 for supplying the Arkhangelsk Region with oil products. Today Rosneft-Arkhangelsknefteprodukt incorporates 11 petroleum storages and 51 gasoline stations.

Figure 4.25 The Russian tanker *Aleksandr Sledzyuk* loading at Rosneft-Arkhangelsknefteprodukt Talagi oil terminal. This ship shuttles oil between Talagi and the FSO ***Belokamenka*** **in the Kola Bay.**

Figure 4.26 The White Sea with the existing and planned oil terminals: (A) Rosneft Talagi terminal in Severnaya Dvina River, (B) Severodvinsk (Tatneft, planned operation in 2006), (C) Onega oil terminal, (D) Ship to ship transfer (ARM-Nefteservis), and (E) Vitino oil terminal in the Kandalaksha Bay.

Since 2002, Rosneft-Arkhangelsknefteprodukt has been involved in oil export. The crude oil extracted in Timano-Pechora province (by Severnaya Neft, a branch of Rosneft), is delivered via the Transneft trunk pipeline Usa-Ukhta-Yaroslavl to the Privodino station where it is loaded into railway tanks and shipped further on by the Northern Railway to the petroleum storage depot in Talagi.

In 2002, the Rosneft-Arkhangelsknefteprodukt export oil terminal in Talagi had a petroleum storage capacity of 217 400 cubic metres, and was able to store simultaneously up to 800 tons of gasoline, 64 000 tons of diesel fuel and 35 000 tons of fuel oil. The maximum volume of daily reloading was 7.2 tons of light oil and 3600 tons of fuel oil. The loading capacity of the terminal amounted 800 tons an hour of light oil and 400 tons an hour for heavy oil products. The sea terminal is capable of mooring tankers of up to 30 000 tons deadweight. The terminal has a railway station, two 150 metres piers for tankers of up to 9.2 metres draft and of up to 25 000 tons deadweight.

In 2003, the Rosneft-Arkhangelsknefteprodukt Company started a full scale reconstruction of the terminal in Talagi in order to increase the capacity of tank car loading racks. After the modernisation, they are expected to handle simultaneously 108 railway tank cars in comparison to 60 in 2002. The reconstruction will also add 100 000 cubic metres of oil storage capacity. The planned channel dredging will allow mooring two tankers, which will allow loading about 400 000 tons of export oil a month. During the first stage of the reconstruction by the end of 2003, the oil shipment facilities had been completed. This installation enabled Rosneft-Arkhangelsknefteprodukt to handle gas condensate delivered from Rosneft-Purneftegaz in Western Siberia and also to load oil of some other

Figure 4.27 In 2003 Rosneft started building a railway terminal in Privodino capable of loading 4 million tons oil a year. The new terminal was opened in December 2004. The line Prividino-Talagi will be served by 700 railway tank cars, later doubled to 1500 cars. Here one of the tanks in the terminal is getting anti-corrosion paint.

companies for export. The capacity of the first line of the new terminal is approximately 2.5 million tons of oil a year; the second line of the terminal, which is expected to handle the same amount of 2.5 million tons, should be put into operation in 2005.

Rosneft will also increase oil export by railway, mostly for oil from the Timano-Pechora province, produced there by a Rosneft subsidiary, Severnaya Neft and a joint venture of Rosneft and ConocoPhillips, Polyarnoye Siyaniye (Polar Lights). For this purpose, the company is building a railway tank car loading rack and approaching tracks at the station in Privodino.

The oil loading station in Privodino 40 kilometres from Kotlas in the south of the Arkhangelsk Region, was built in 1974. In 2003 Rosneft started building a railway terminal capable of loading 4 million tons of oil a year. The terminal was planned to be completed by June 2004, but the construction activities were slower than planned, and the new terminal was in operation in December 2004. The line between Privodino and Talagi will be served by 700 railway tanks, and in the future this number should be doubled to reach 1500 tank cars.

Icebreaking assistance to oil shipment in winter will be provided by the Arkhangelsk seaport. In 2004, Rosneft signed a contract with the Russian Ministry of Transport on the lease of a line icebreaker, which will provide ice breaking assistance not only for Rosneft tankers, but also for the ships of the Arkhangelsk port.

Oil spill prevention and response services at the oil loading terminal are provided by the special unit of the Rosneft-Arkhangelsknefteprodukt.

Since 2004, Rosneft has been using a new transport scheme for the export oil shipment using the *Belokamenka* storage tanker (360 000 tons deadweight) that is moored in the Kola Bay.

The line between Talagi and *Belokamenka* in 2004 was served by shuttle tankers *Samburga* (17 100 tons deadweight; built in 1976), *Rundale* (17 000 tons; 1977) and *Ropazi* (17 600 tons, 1985) of the Latvian Shipping Company; and *Indiga* (15 900 tons; 1976), *Georgiy Kononovich* (17 200 tons; 1976) and *Aleksandr Sledzyuk* (17 200 tons; 1975) of the Murmansk Shipping Company.

In 2002, the Rosneft-Arkhangelsknefteprodukt terminal in Talagi shipped for export 1.93 million tons of oil and oil products; in 2003 the volume was 1.5 million tons; and in 2004 the shipment for exports is expected to be 3.4 million tons, among them 2.2 tons of oil was sent to *Belokamenka*. The plan for 2005 is to reload about 4 million tons of oil.

Rosneft has plans to increase the shipment volume of 4 million tons of hydrocarbons in 2005 to 7.2 million tons by 2010. After 2006, when the loading capacities will reach their maximum level of 4.2 million tons of oil and 1.5 million tons of gas condensate a year, the growth of reloading volumes may be achieved by increasing the diesel fuel transport. The total shipping volume in 2006 is expected to amount to 6.2 million tons. At the same time, the expected merge of Gasprom and Rosneft and the creation of Gaspromneft Company can increase the traffic through the Arkhangelsk port by three million tons a year due to transshipping of Gasprom's gas condensate.

Figure 4.28 Tatneft plans to have their Severodvinsk oil terminal in operation in 2006.

Figure 4.29 In June 2003 the Volgotanker Company started ship to ship transfer (STS) of oil near the Osinki Islands, Onega Bay. Oil was delivered to the STS by small tankers of the *Nefterudovoz*-type, north through the White Sea-Baltic canal. The 28 000 dwt *Zoja-I* and *Zoja-II* delivered fuel oil to Rotterdam.

Severodvinsk

Severodvinsk, the second largest city in the Arkhangelsk Region, was built in 1936. The city is situated in 30 kilometres to the west of Arkhangelsk. Severodvinsk is the centre of submarine shipbuilding, and the main enterprises of the city are machine-building factories Sevmashpredpriyatiye and Zvezdochka. Today Severodvinsk is also an important industrial and production base for the development of the hydrocarbon fields in the Russian Arctic continental shelf.

Tatneft started to build an oil export infrastructure in Severodvinsk in 2003. At that time, the Tatneft-Arkhangelsk Company was choosing a location for the future oil shipment terminal. This terminal should be built in the southern part of Yagry Island, in the vicinity of Zvezdochka factory with the piers stretching down to the Severodvinsk port.

The location in Severodvinsk is suitable for construction of the terminal since the navigation channel has a strong water current, and it was built for large size submarines, so the company will therefore not have to do additional dredging. The sea depths in the area allow receiving 40 000 tons deadweight tankers.

Tatneft is planning to use the terminal for export of its own oil delivered to Severodvinsk by railway. The oil shipment volumes are expected to be about 2.5 million tons a year.

The construction of the terminal was planned to start at the end of 2004, and then the loading operations can begin in 2006.

The Onega Bay and the White Sea-Baltic canal

The White Sea-Baltic canal, connecting the Onega Lake and the White Sea through 19 water locks, was built in 1933. The canal connects five seas, and for a long time it was the main transportation waterway for northern Karelia and the Murmansk Region. In the 1990s, the canal was practically out of business but on its 70th anniversary the canal finally saw the beginning of its own revival.

In 2003, Volgotanker Company started a project called "The White Sea". Upon the project's completion, the canal should be able to provide a transportation channel for oil products with further reloading to a storage tanker anchored in the White Sea. During the summer navigation of 2003 Volgotanker planned to transport through the canal 800 000 tons of oil, and increase the volume up to 1.5 million tons in 2004.

Initially, it was planned to anchor a storage tanker 36 kilometres to the northeast of Onega town, in the vicinity of Osinki Islands in the Onega Bay of the White Sea. The anchorage was intended to position a storage tanker of 80 000 tons deadweight for reloading oil from 2700 tons deadweight shuttle tankers into sea carrier tankers of 68 000 tons deadweight in the board-to-board mode. The plan was to use the anchorage during the navigation period from May to September for loading fuel oil M-40 and M-100. Volgotanker had plans for using 30 river-sea class tankers of *Nefterudovoz* type to carry oil through the White Sea-Baltic canal and reload it for export in the Onega Bay.

In reality, the fuel oil was reloaded offshore in the Onega Bay from *Nefterudovoz* shuttle tankers directly into carrier tankers of 28 000 tons deadweight *Zoja-I* (built in 1988) and *Zoja-II* (1989) of the Latvian Shipping Company. The terminal began operation on June 24 2003, when the first two river tankers *Nefterudovoz-24M* (1977) and *Nefterudovoz-38* (1981) delivered 2700 tons of fuel oil each to the sea tanker *Zoja-I*. On June 30th the tanker with 27 000 tons of fuel oil left the Onega Bay heading for Rotterdam.

The Onega seaport and the Arkhangelsk seaport provided towage for the loading operations at the anchorage. Morskaya Liga, Kronstadt, was to provide oil spill prevention and response services at the anchorage terminal.

Figure 4.30 The Russian tanker *Aleksandr Sledzyuk* at the pier in Vitino during winter operation. The Lukoil Arctic Tanker *Saratov* is waiting to load. An icebreaker and two tugs are available for support.

On September 1st 2003, *Nefterudovoz-57M* (1987) while moored to the tanker *Zoja-I* leaned over to the left shipboard, was dented and spilled fuel oil into the sea (more details in chapter 5.3.2). A number of lawsuits followed the oil spill accident, and in the end, the court ruled that Volgotanker was to pay the municipality of Onega and the Onega District about 12.5 million RUR as compensation for the environmental damage caused by the oil spill.

On October 4th 2003, Volgotanker finished oil reloading operations in the Onega Bay. In 2003, 220 000 tons of fuel oil were delivered for export via the White Sea-Baltic canal (26 *Nefterudovoz* tankers dispatched 72 shipments) during 2003. Apart from that, Volgotanker also loaded 100 000 tons of crude oil in the Onega Bay terminal in September 2003. Crude oil was delivered by shuttle tankers from Vitino port and loaded to tanker *Trader* (127 000 tons deadweight; built in 1978). In 2004, Volgotanker has not got a permit from the environmental authorities to resume the oil loading operations in the Onega Bay of the White Sea.

At present, the ARM-Nefteservis Company is preparing the required technical documentation for the construction of an offshore oil reloading complex at the Onega Bay terminal. The plans are to deliver oil to the station in Shendunets in the Onega area by railway. Then the oil will be reloaded into the onshore petroleum storage that should have the capacity up to 180 000 cubic metres. Thereafter, the oil will be delivered via a 9 kilometre pipeline to the shore and further on via a 30 kilometre underwater pipeline to the offshore reloading unit in the vicinity of the Osinki Islands. From there the oil will be shipped by carrier tankers to the customers abroad. The reloading complex should operate all-year-round, and its turnover is expected to be about 5 million tons of oil a year.

Vitino, Kandalaksha Bay

The specialised seaport of Vitino is the first private seaport in Russia. It was developed as a result of the project for construction of a new port terminal for large-capacity tankers. The terminal was intended to use the

capacities of the Belomorskaya Neftebaza (the White Sea petroleum storage depot) located on the southwest coast of the Kandalaksha Bay of the White Sea.

Belomorskaya Neftebaza was built during the years from 1972 to 1975 with the purpose of distributing oil throughout the Murmansk Region. With the arrival of the investors in 1993, the port was modernised and rebuilt to load crude oil from railway tank cars into sea tankers.

The first shipment of oil for export was carried out in 1995 by the tanker *Probitas* (31 000 tons deadweight, built in 1974) under the Maltese flag. During the summer of 1995, the port served the total of 9 tankers and loaded 250 000 tons of oil. From 1996 to 1999 the port of Vitino loaded for export from 500 000 tons up to 1 million tons of oil a year although operating only during the summer navigation period.

In 1999, the Belomorskaya Neftebaza changed hands. The company Rosneft-Murmansknefteprodukt obtained 95% of the stocks and another 5% went to NITEK Company. That same year they founded the seaport Vitino Ltd.

Since 2001, Vitino has systematically increased volumes of oil shipment by carrying out modernisation and reconstruction of the oil loading terminal. In 2002, the port of Vitino got a permit for oil loading during the winter navigation, and began to operate all-year-round. During winter navigation, oil is loaded into 20 000 tons ice-reinforced tankers, and the ice breaking assistance is provided by the ice-breaking fleet of the Murmansk Shipping Company.

Until 2003, oil spill prevention and response in Vitino was provided by the Murmansk Basin Emergency and Salvage Department. In 2003 the port of Vitino created a specialised oil spill prevention and response division.

In 2004 the port of Vitino could receive tankers with 60 000 tons deadweight. The ship channel of 18 miles (3 straight passages, 4 turning points) was dredged to the depth of 12.5 metres. 4 moorings served one sea tanker and two river tankers simultaneously. The pumping equipment was modernised to reach the capacity of 3000 cubic metres an hour (from 500 cubic metres an hour in 1996). The petroleum storage capacity of the Belomorskaya Neftebaza had the capacity of 230 000 cubic metres. The local oil pipeline length was 40 km. The terminal has two tank car racks with capacity to simultaneously process 82 tank cars. The port is able to process up to 140 000 tons of crude oil, 100 000 tons of fuel oil, and 120 000 tons of gas condensate a month. The general oil shipment capacity of the terminal in the beginning 2004 was about 8 million tons a year.

In order to pilot and moor 100 000 ton deadweight tankers in Vitino, the seaport carried out a necessary dredging of the port's navigation channel in 2004. The port also started reconstructing the 15-metre draft pier. Two more railway tank car racks were under construction, and one was completed in 2004. The unloading area was expanded to reload 118 tank cars. The second tank car rack should be completed in 2005 enabling the terminal to handle 154 tank cars simultaneously. The reconstructed tank car racks are designed to unload oil with preheating and recirculation of liquid fuel. The company also began the construction of two 30 000-cubic metre storage tanks.

Oil is delivered to the port of Vitino by rail mostly from the terminals in Yaroslavl and Moscow where it arrives via trunk pipelines of Transneft from fields in Timano-Pechora province and Western Siberia. In Vitino the oil is shipped to export directly or via the offshore reloading complex in the Kola Bay where oil is delivered by shuttle tankers.

In 2004, the route Vitino-Murmansk was served by shuttle tankers *Indiga* (16 400 tons deadweight; built in 1976), *Varzuga* (16 400 tons, 1977), *Aleksandr Sledzyuk* (17 700 tons; 1975), *Georgiy Kononovich* (17 700 tons; 1976), *Khatanga* (23 000 tons, 1987) of the Murmansk Shipping Company; and *Magas* (20 000 tons; 2000), *Astrakhan* (20 000 tons; 2000), *Kaliningrad* (20 000 tons, 2001) of Lukoil-Arctic-Tanker. Oil was also loaded to such line tankers as: *Baltic Captain* I (37 400 tons; 2000), *Tikhvin* (40 700 tons; 1996), *Doubtless* (47 000 tons; 1991), *Anichkov Bridge* (47 800 tons; 2003), *Palva* (48 300 tons; 1986).

In 2001, Vitino processed 1.8 million tons of export oil; in 2002 the volume was 2.9 million tons; in 2003 the volume grew to 5.7 million tons; while in 2004 oil shipping volumes slightly dropped because the new coastal oil terminals in Murmansk were put into operation, and Vitino shipped 3.7 million tons. The plan for 2005 is to ship up to 7 million tons of oil and oil products.

Figure 4.31 Map over the Kola Bay with existing and planned terminals (red circles): (A) The oil terminal at the Murmansk Fishery Port started exporting oil in 2003, (B) The oil terminal at the Ship-repair Factory #35 started exporting oil in 2004, (C) The FSO terminal RPK-1 started exporting oil in 2002, (D) The STS terminal RPK-2 started exporting oil in 2003, (E) The FSO terminal RPK-3 started exporting oil in 2004, (F) An oil terminal under construction at Cape Mohnatkina Pakhta, Severomorsk District, and (G) Plan for a new oil export terminal near Kulonga on the west side of the Kola Bay.

Figure 4.32 The export of oil from the Murmansk Fishery Port started in 2003. The tanker *Severomorsk* (40 000 dwt) is one of the shuttle tankers.

4.2.3 The Barents Sea

Murmansk and the Kola Bay

The port of Murmansk is the only ice-free sea port in the north of Russia. The Murmansk seaport was constructed during the First World War in 1915, and in the 20th century became one of the largest seaports of Russia.

The Murmansk seaport today is the huge transportation unit that integrates automobile, railway and sea communication of the region. The fairway depths of the moorings in the port of Murmansk are up to 15 metres and allow mooring 140 000 tons tankers. The annual freight turnover of the Murmansk seaport in 2002 and 2003 amounted 10 million tons. In 2004, the turnover of the Murmansk Sea Trade Port increased to 12.5 million tons, in addition more than 7 million tons of cargo, primarily oil and other oil products, were transshipped by other operators in the Murmansk port and the Kola Bay. According to October Railway, it is expected that in 2010-2015 the freight turnover of Murmansk may increase to 40 million tons a year.

In 2004, two new coastal oil terminals for unloading railway tank cars with further shipment into sea tankers were put in operation in Murmansk. The first started reloading oil at the petroleum storage depot in the Murmansk Sea Fishery Port, and the second was constructed at Ship-repair Factory #35. During the last two years, three offshore oil transshipment terminals (hereafter RPK) were eventually installed in the Kola Bay. The terminals RPK-1 of the Murmansk Shipping Company, RPK-2 of the White Sea Service Company, and RPK-3 *Belokamenka* of Rosneft were built for shipping oil for export. At present, the fourth offshore oil shipment terminal is under construction on Cape Mohnatkina Pakhta in the Kola Bay.

Coastal oil terminals

The first coastal oil reloading terminal in Murmansk was put in operation at the petroleum storage depot of the Murmansk Sea Fishery Port.

The construction of the fishing port in Murmansk started in 1925; the first section was ready in 1927. Today Murmansk Sea Fishery Port is a modern

Figure 4.33 *Cheguevara* (45 500 dwt) operates as shuttle tanker from the terminal on the Ship-repair Factory #35 to the terminal ship *Trader* at RPK-1. The terminal at the Ship-repair Factory #35 was opened in 2004. At this stage the terminal has an annual capacity of 3.5 million tons of oil.

automated enterprise of the Murmansk Region that specialises in on handling fishing boat cargoes, fishing depot ships, and transport refrigerators. The total extent of mooring front of the sea fishing port exceeds 4 kilometres. The port has its own petroleum storage depot. In the end of the 1990s, the petroleum storage depot processed about 500 000 tons of oil annually. The operations for reloading oil from railway tanks into sea tankers for export were started in Murmansk Sea Fishery Port in 2003.

In 2003, the petroleum storage depot of Murmansk Sea Fishery Port processed a total of 1.65 million tons of oil; in 2004 the petroleum storage depot was expected to handle more than 2 million tons of oil cargoes.

The export oil is offloaded from tank cars into shuttle tankers of 15 000 tons deadweight of the Murmansk Shipping Company that deliver oil for reloading at offshore oil transshipment terminal 1 (RPK-1).

In 2004, Murmansk Sea Fishery Port started a full-scale reconstruction of the oil shipment section in the port. The reconstruction mostly included the channel dredging to enable mooring tankers of up to 30 000 tons deadweight. The capacity of the petroleum storage depot was expanded as well. The outdated unloading equipment was replaced to cut the reloading time by 40%, and that should increase the throughput of the railway rack by 50%. After the reconstruction, the capacity of the oil reloading terminal of the Murmansk Sea Fishery Port should grow to 2.5 million tons of oil a year.

Oil spill prevention and response services at the terminal are provided by the specialised unit of the Murmansk Sea Fishery Port.

The second coastal oil reloading terminal in Murmansk was created at the Ship-repair Factory #35, former Sevmorput.

Murmansk Sevmorput factory was founded in 1932 as a maintenance factory for the merchant fleet. The building of the factory began in 1936 and was completed in 1938 (the builders were mostly political prisoners, and the construction site was called ROST – "rayon osobogo stroitelstva", that means the zone of the special construction; nowadays, it is the Lenin district of Murmansk city). In 1943, the factory was a part of the Northern Navy Fleet of the USSR. In 2003, Sevmorput changed the owner and was renamed the Federal State Unitary Enterprise Ship-Repair Factory #35 of the Russian Ministry of Defence.

In 2003, Tangra Oil Company in cooperation with the Ship-repair Factory #35 started to build a port oil shipment terminal on the territory of the factory. The 10 kilometre pipeline from the tank car rack leading to the mooring was constructed. The oil from railway tank cars is loaded straight into shuttle tankers via the pipeline. The first section of the terminal with the reloading capacity up to 3.5 million tons a year was put in operation in 2004. Oil was unloaded from railway

Figure 4.34 In August 2004 *Trader*, a tanker of 127 000 dwt was anchored as a storage tanker in RPK-1. About 4 million tons were exported over RPK-1 in 2004. By the side of *Trader* is the tanker *Volgograd City* offloading its cargo.

tank cars into shuttle tankers *Cheguevara* (45 500 tons deadweight; built in 1981) and *Severomorsk* (40 000 tons; 1982) of Severnaya Stividorskaya Company, a branch of Tangra Oil. The shuttle tankers deliver oil to the storage tanker *Trader* at the offshore oil shipment terminal 1 (RPK-1) in the Kola Bay.

Oil spill prevention and response services at the terminal are provided by Gidrotekhservis Company.

In 2004, the development of the oil shipment terminal continued. In particular, the second tank car unloading rack was under construction. Upon completion of the recent modernisation works it is planned to moor 127 000 tons deadweight storage tanker *Trader* at the pier of Ship-repair Factory #35, and unload oil from railway tank cars directly into the storage tanker. Oil from the storage tanker will be shipped into the carrier tankers for export. The operational capacity of the terminal is expected to increase up to 7.5 million tons a year. In 2004, the coastal terminals of the Murmansk Sea Fishery Port and Ship-repair Factory #35 delivered about 3.7 million tons of oil to RPK-1 in the Kola Bay.

Offshore oil transshipment terminals in the Kola Bay

The first offshore oil transshipment terminal (RPK-1) in the Kola Bay was constructed by the Murmansk Shipping Company in the area of Cape Mishukovo. In October 2002, RPK-1 exported the first crude oil, then the tanker *Moscow River* (106 000 tons deadweight; built in 1999) of Novoship was loaded with the first tons of oil delivered by tankers *Burgas* (54 500 tons; 1981) and *Geroi Sevastopolya* (55 800 tons; 1979) from the port of Vitino. RPK-1 was operating as a Ship to Ship Transfer (STS) facility.

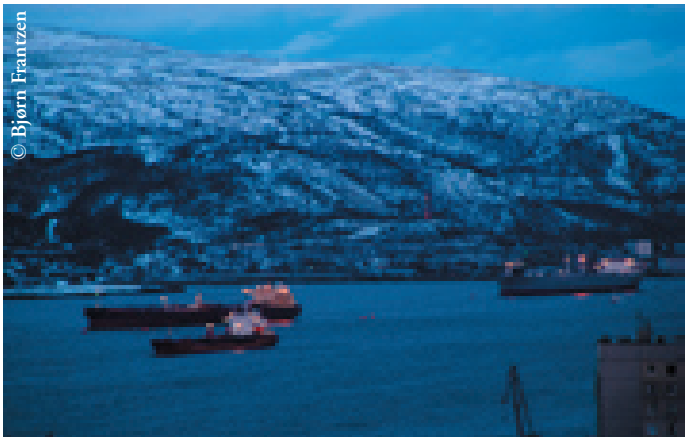


Figure 4.35 The White Sea Service Company built RPK-2 north of RPK-1, and the terminal was opened in December 2003. The terminal was in service for only three months. December 4th 2003 *Kuban* was anchored in RPK-1 and *Trader* in RPK-2.

The terminal has eight anchorage-mooring systems (anchors, bridles, flanks) capable of serving sea tankers of up to 150 000 tons deadweight in severe weather conditions with a wind of up to 20 metres per second. 15 000-60 000 tons shuttle tankers can be moored directly to line tankers for uploading oil. The terminal operates all-year-round. The projected capacity of RPK-1 is 5.4 million tons of oil a year.

Oil spill prevention and response services for the terminal RPK-1 are provided by the Murmansk Basin Emergency and Salvage Department (MBESD).

In August 2004, the *Trader* (127 000 tons; 1978) storage tanker was anchored at the RPK-1, and now the oil is shipped for export via the storage tanker, and *Trader* operates as a Floating Storage and Offloading Vessel (FSO).

In 2003, RPK-1 exported 3.7 million tons of oil, and in 2004, the volume reached 4.3 million tons.

Oil is delivered to RPK-1 from terminals in Varandey, Vitino, Murmansk Sea Fishery Port and Ship-repair Factory #35 by shuttle tankers. Further, oil is shipped for export to line tankers with about 100 000 tons deadweight.

The second offshore oil transshipment terminal (RPK-2) in the Kola Bay was built by the White Sea Service Company, and put in operation in December 2003, but it worked for 3 months only as a STS facility.

The third and largest terminal (RPK-3) *Belokamenka* was put in operation as a FSO facility in March 2004. RPK-3 *Belokamenka* is the key unit of the northern oil export channel developed by Rosneft.

The main unit of RPK-3 is an oil storage tanker *Belokamenka* (built in 1980), the largest tanker in Russia of 360 000 tons deadweight. The tanker is 340 metres long and 65 metres wide. The tanker *Belokamenka*, former *Berge Pioneer*, was chartered by Rosneft for 20 years with the right of subsequent buy-out from the Norwegian company Bergesen d.y. ASA. The latter is conducting the maintenance and operation of the vessel in Russia, in cooperation with the Far-East Marine Company (FEMCO).

In February 2004, the tanker came to Kola Bay and was moored near Belokamenka place. After installation

Figure 4.36 Export was boosted when *Belokamenka* was put into operation in March 2004. The 360 000 dwt former *Berge Pioneer* was chartered by Rosneft for 20 years. It receives oil from Talagi in the White Sea and it will also serve the platform Prirazlomnoye when it starts to produce. The 16 420 dwt tanker *Indiga* looks like a toy beside *Belokamenka*.

of the new oil storage in the Kola Bay, Rosneft obtained a new oil delivery route "from the oil well to the consumer". The oil extracted by Rosneft subsidiaries in Timano-Pechora province is delivered to the terminal in Arkhangelsk, and then uploaded into shuttle tankers, and transported to the storage tanker, from where it is exported by up to 200 000 ton deadweight tankers.

In February 2004, the storage tanker *Belokamenka* received the first oil from shuttle tankers *Volgograd* (16 000 tons; 1998), *Rundale* and *Samburga* from Arkhangelsk. In March, RPK-3 shipped the first oil for export into the line tanker *Moscow River*. In August, *Belokamenka* shipped the first millionth ton of oil. In 2004, RPK-3 *Belokamenka* received 2.5 million tons of oil to be sent for export.

The oil spill prevention and response services at the terminal *Belokamenka* are provided by MBESD. In June 2004, the company organised a full scale oil spill response exercise in the Kola Bay simulating an accident of 500 tons oil spill in the area of the terminal. MBESD vessels and personnel, the Arctic Specialised Marine Inspection, Masko Company and the RPK-3 terminal personnel took part in the oil spill response exercise.

The storage tanker *Belokamenka* receives oil delivered to the Kola Bay by shuttle tankers from the terminals in Arkhangelsk and the Ob Bay of the Kara Sea. In the future, *Belokamenka* will also handle oil from Prirazlomnoye field. The operational capacity of RPK-3 Belokamenka today is 5 million tons of oil a year. In the future it can be increased to 10 million tons of oil a year.

In 2004, terminals in the Kola Bay handled more than 7 million tons of export oil delivered to the western market by line tankers such as: *Krasnodar* (115 000 tons, 2003) and *Moscow* (106 000 tons, 1998) of Novoship; *Nevskiy Prospect* (115 000 tons, 2003) of Sovkomflot; *Sakhalin Island* (108 000 tons, 2004) of Primorsk Shipping Corporation; *Nordic Svenita* (106 000 tons; 1997) of Teekay Shipping; *Iran Saveh* (159 000 tons; 2001) of National Iranian Oil Company; and others.

Constructed and projected terminals

The fourth offshore oil shipment terminal (RPK-4) with the capacity of 2.5 million tons a year is under construction on Cape Mohnatkina Pakhta in the Severomorsk District. RPK-4 will use the capacity and the infrastructure of the petroleum storage depot owned by the Northern Navy Fleet. The building subcontractor of the new terminal is the company Commandit Service, and the contractor is Sudkomgrup Holding SPb. During the first 2-3 years of operation, RPK-4 will load oil into tankers of 50 000 tons

Figure 4.37 The Varanger Fjord and the Kirkenes area with a planned FSO oil terminal (red circle): (A) Bøkfjorden.

deadweight via the existing pier, and later via the newly constructed stationary berth. The pier will moor an oil storage tanker of more than 100 000 tons deadweight.

Also Murmansk Shipping Company and Murmansk Sea Commercial Port have plans to construct a coastal oil terminal on the western coast of the Kola Bay. The shipment route should be the railway to Paive or Murmashi railway station, and then oil should be transported via the constructed railway and pipeline to the onshore petroleum storage facilities in the area near Kulonga or Lavna. It is planned to construct a pier to moor 300 000 ton deadweight tankers. The projected throughput of the terminal during the initial stage is planned to be 2 million tons a year, with a future increase to 4.5-7 million tons a year. The construction work should start in 2005, and then the first line of the terminal will be put into operation in 2008.

Figure 4.38 In May 2002, in Ropelvbukta at Kirkenes, the cargo of the Lukoil tanker *Saint Petersburg* was transferred to the Greek tanker *Shinoussa*.

Oil terminals in Eastern Finnmark

Ever since the oil transportation from Russia started dramatically growing in 2002, there were thoughts and suggestions about the establishment of an oil terminal for Russian oil in the Norwegian county of Finnmark. There were proposals to build such terminals in Vardø, Paddeby and in Bøkfjord outside Kirkenes. Of these three places only for the one in Bøkfjord was a formal request made for a permit for oil transfer terminal. The work to obtain such a permit for the projected terminal has continued since 2002. The ship owner Bergesen d.y. ASA planned to

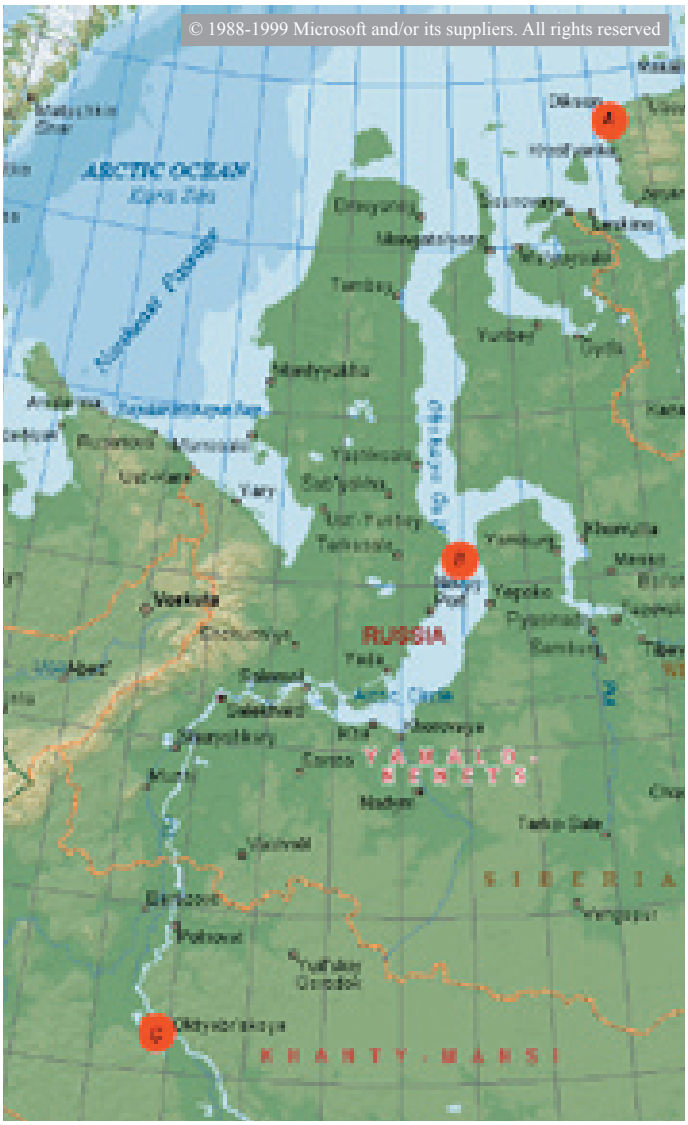


Figure 4.39 The Kara Sea with existing and planned oil terminals (red circles): (A) Dikson (planned in operation 2008), (B) Ob Bay (STS-transfer), and (C) Andra on the Ob River (summer shipment of oil down the river to the Ob Bay). From the Ob Bay the oil is transported westwards along the Northern Sea Route for reloading in the Kola Bay.

anchor the old *Berge Enterprise* super tanker and use it as a Floating Storage and Offloading Vessel (FSO) oil transfer terminal. This is a similar solution to that the Bergesen Company has with the ship *Belokamenka* (previousely *Berge Pioneer*) in the Kola Bay near Murmansk.

The anchored storage ship in Bøkfjord is considered as a permanent installation. The prospects of establishing a terminal in Bøkfjord are based on the future increase of the oil to be shipped from the Russian part of the Barents Region ports, and on the belief that the Russian side has not enough oil reloading facilities.

In May 2002 there was an oil transshipment operation in Ropelvbukt near Kirkenes, then 3 Lukoil tankers of *Astrakhan* type delivered 15 000 tons of oil each to the Greek tanker *Shinoussa* (46 500 tons deadweight, build in 1990) of Eletson Corporation.

4.2.4 The Kara and Laptev Seas

Ob Bay, the Kara Sea

In 1999, the RITEK Company made the first shipment of oil in the Ob Bay, and transported oil to the west by the Northern Sea Route. The oil, extracted at Sredne-Khulymskoye and Sandbinskoye oil fields in the Western Siberia, is delivered via local pipelines to the petroleum storage facilities in Andra and Numgi on the Ob River coast. There, oil is loaded to the river-sea tankers of *Lenaneft* type (2100 tons deadweight) of Irtysh River Shipping Company and transported down river to the Ob Bay of the Kara Sea. Oil delivered to the Ob Bay is shipped into shuttle tankers of *Astrakhan* type (20 000 tons) offshore in the area of Cape Kamenny. Shuttle tankers transport oil via the Kara Gate to the offshore oil transshipment terminal *Belokamenka* in the Kola Bay.

Oil spill prevention and response services during the offshore oil loading in the Ob Bay are provided by Murmansk Basin Emergency and Salvage Department (MBESD).

In the period from 1999 to 2003, in the Ob Bay RITEK loaded and sent to export in total 470 000 tons of oil, and in 2004 the amount was 240 000 tons.

In 2004, the route Ob Bay-Kola Bay was served by the ice-reinforced shuttle tankers *Kaliningrad* (20 000 tons deadweight; built in 2001) and *Magas* (20 000 tons; 2000) of Lukoil-Arctic-Tanker.

Dikson, the Kara Sea

Dikson Island, a settlement and a port, is located in the north-eastern part of the Yenisei Gulf of the Kara Sea on Taimyr Peninsula. Until now it has been the only sea port in the Kara Sea. The settlement on Dikson Island appeared in 1915. In 1934, the state started the construction of the Dikson seaport as a main port on the line of the Northern Sea Route for maintenance, mooring and coal supply for the passing ships. The

Figure 4.40 *Vladimir Arseniev* in the port of Dikson. Rosneft has plans to ship up to 30 million tons of oil annually from Dikson to the Barents Sea after 2008.

fairway channels allow mooring ships of up to 50 000 tons deadweight. Today, the freight turnover of the port is about 14 000 tons a year. The summer navigation period is about one month only, from mid August to mid September.

The largest nature reserve in Russia and the whole Eurasia, Bolshoy Arkticheskiy (Great Arctic State Nature Reserve) with a total area of 42 000 km^2 is situated in Taimyr.

By 2008, Rosneft is planning to construct an oil pipeline Vankor-Dikson via Dudinka and an oil loading terminal in Dikson for further export deliveries by the Northern Sea Route. While the pipeline port is under construction the oil shipment will run in Dudinka.

Figure 4.41 By 2008 the Rosneft Company is planning to construct an oil pipeline Vankor-Dikson and an oil-loading terminal in Dikson for further export deliveries by the Northern Sea Route. The capacity of the 710 km oil pipeline is expected to be 30 million tons a year.

The throughput capacity of the 710 kilometres long oil pipeline is expected to be 30 million tons a year. The pipeline should integrate on its way nine oil fields located on the territory of the Krasnoyarsk Region and Taimyr. The proven reserves on these fields are 500 million tons of oil and up to 700 million tons of gas. The major hydrocarbon fields are oil fields of the Vankor group in Turukhansk area of the Krasnoyarsk Region. The total extractable oil reserves in Vankor field, according to Rosneft, are 125 million tons of oil, and for Northern Vankor field they are estimated at 38 million tons of oil. The industrial oil production on these fields should start in 2008.

Tiksi, the Laptev Sea

The commercial sea port in Tiksi, in the north of the Republic of Sakha (Yakutia), was built in 1934, primarily for carrying commercial cargo and essential supplies from the European part of Russia to Yakutia, and exporting coal and wood along the Northern Sea Route.

In 2001, the company Sakhaneftegaz in cooperation with the Murmansk Shipping Company started oil loading in Tiksi for further export via the Northern Sea Route. Then the first 19 000 tons of oil from Talakanskoye field in Eastern Siberia were shipped into the tanker *Magas* and sent to the western market.

The oil extracted at Talakhanskoye field was delivered via a 110 kilometre local oil pipeline to the oil refinery and the terminal in Vitim on the Lena River. From there, oil was transported down by the Lena River by

Figure 4.42 While the Dudinka-Dikson part of the Vankor-Dikson pipeline is under construction, the oil will be exported from the port of Dudinka (picture) in the Yenisay River. Dudinka is the port for the shipping nickel from Norilsk.

Lenaneft tankers of the Lena River Shipping Company to petroleum storage facilities in the port of Tiksi. In Tiksi oil was shipped to sea tankers up to 20 000 tons deadweight and sent for export.

In the summer of 2001, the port of Tiksi loaded for export 38 000 tons of oil, and in 2002 it was already 58 000 tons.

Since December 2003, the licence for development of Talakanskoye oil and gas field belongs to the company Surgutneftegaz. The oil transportation from Vitim along the Lena River consists also of necessary fuel supplies for the provinces of the Republic of Sakha. The volumes of Talakanskoye oil sent for export via Tiksi are insignificant. The capacity of this export line today is up to 100 000 tons of oil a year. In the future, with the development of Yakutia's largest oil field (extractable reserves of Talakanskoye oil and gas field are 115 million tons of oil and 47 milliard cubic metres of gas) there are plans to export oil eastwards. Administration of the Republic of Sakha suggested using river tankers, railway tank cars and sea ships for oil export to the east. In perspective, Talakanskoye oil can be transported by the trunk pipeline Eastern Siberia-the Pacific Ocean to be built by Transneft.

Figure 4.43 The Republic of Sakha, the Lena River and the town of Tiksi in the Laptev Sea with existing oil terminals (red circles): (A) Vitim river oil terminal and (B) Tiksi terminal.

Figure 4.44 From the Talakanskoye field oil is delivered in a 110 kilometre temporary (1996-2003) pipeline to Vitim, a village situated along the Lena River. From Vitim the oil is transported northwards on the Lena River to the coastal town Tiksi by *Lenaneft* river tankers. *Magas* shipped the first 19 000 tons from the Laptev Sea in 2001.

Figure 4.45 July 5th 2001, the newly built Russian oil tanker *Kaliningrad* had an engine stoppage north of Fugløya, Troms with 17 000 tons of crude oil on board. *Kaliningrad* was 200 metres from running aground when she got the engine running again.

4.2.5 Oil transportation from Northwest Russia and Norwegian Coast Emergency Response System

Introduction

The transit line from Northwest Russia to the continent along the Norwegian coast became busy due to the large-scale oil transportation from 2001-2002. This brought a potential environmental threat to the vulnerable coastal areas. The Norwegian Coastal Administration and the Defence Department were the authorities that had to handle the situation on behalf of the state. Well-founded resources along the coast, especially in Northern Norway, including control over the necessary supplies and monitoring system, made the Armed Forces the key player in the area.

The Norwegian Coastal Administration is the main responsible factor in the emergency response system. By this we mean plans and measures that are carried out or are to be carried out in order to prevent or reduce the threat to the marine environment.

The Navy is currently the only state authority that has a permanent presence in the sea areas (until the tug readiness system was established). On these grounds, the Navy is a real contributor to sea safety and to the emergency response system. Other divisions of the Armed Forces also contribute especially maritime patrol aircraft and rescue helicopters. The Armed Forces participation from its different divisions is coordinated by the operative headquarters in Stavanger (Norwegian National Joint Headquarters – NO NJHO) and in Bodø (Regional Headquarters North Norway - RHQNN). The contribution of the Armed Forces is rendered as support to the Norwegian Coastal Administration.

Two sea accidents/near accidents that occurred in 2000 and 2001 demonstrated the importance of establishing an adequate emergency response system in connection to the growing oil traffic.

At Christmas 2000, the freighter *John R* ran ashore in Northern Troms. The vessel was completely wrecked and broke in two. In July 2001, the newly built and fully loaded Russian oil tanker Kaliningrad had a main engine failure almost in the same area. The vessel was almost driven ashore when it finally managed to start the machinery and was again underway.

These two incidents made the state authorities that are in charge of sea safety and coastal emergency response system focus more on the oil transport from Northwest Russia. This part of the report gives an account of the way the Norwegian Armed Forces and the Norwegian Coastal Administration follow up oil transportation from Northwest Russia. In addition, the report provides data about the traffic growth since 2002.

Daily tracking of the traffic - Practice up to 2003

The 2001 accidents and the engine stoppage of the fully loaded 100 000 ton tanker *Moscow* off North Cape in 2003 demonstrated the drawbacks of the emergency response system on day-to-day basis. Because the Armed Forces at the time had all the resources and monitoring capabilities, this authority eventually became an important contributing factor with respect to monitoring and control of the oil traffic.

At first the control was limited to monitoring tankers by the radar operators at Defence Command North Norway in Bodø. There was little communication with the tankers and there was no system for notification of approaching oil transports. The tankers were kept in view and reported to superior and subordinate units as well as to the Norwegian Coastal Administration

Daily Routines (2003 – present day)

In the period of 2002 – April 2003, the following-up of oil transports came into more structured forms. The main emphasis was given to routines for informing the tankers about the required route 12 nautical miles from the shore and the coastal emergency response regulations in Norway. Also, a database was established for keeping a register of the traffic. This information has later been used for dimensioning the tugboat readiness system in the area Røst-Varangerfjord and for the planning and implementation of mandatory traffic lanes inside Norwegian territorial waters between Vardø and North Cape.

Today these general routines are followed for monitoring oil tanker traffic:

Tankers heading northward with ballast

When tankers are in transit to Northwest Russia, RHQNN sends an information fax to the vessels. This contains information about:

- The emergency response system regime along the Norwegian Coast, the Armed Forces role in this, information about free-of-charge tug

boat assistance and the role of the Main Rescue Coordination Center (MRCCs);
- The Norwegian authorities' request to be informed on the transit before vessels enter the Norwegian Economic Zone (NEZ). Norwegian authorities also request the vessels to report position and status every twelve hours while transiting the Norwegian coast. It is emphasized that both pre-arrival notification and underway reporting is voluntary.
- That the Norwegian authorities request the vessel to keep a distance of minimum 12 nautical miles off the coast and that traffic separation zones are established inside 12 nm in the area Vardø-North Cape;
- Telephone and fax numbers, mail addresses of NO NJHQ, RHQNN, Fedje Vessel Traffic Center – VTC and the MRCCs.

RHQNN contacts the vessels to make sure that the contents of the fax are understood.
Attached to the fax is a notification form that should be used by the vessels to inform the Norwegian authorities before they approach the Norwegian coast. The form requires the following information to be submitted:
- Vessel data (ownership, flag, communication, captain, dimensions, hull type, tug assistance mode),
- Type of cargo (type, amount) and
- Transit data (entry in the Norwegian Economic Zone (NEZ), exit of the NEZ, port of departure, destination, ports of call in Norway, sailing route).

The pre-arrival notification shall help to make a proper use of the monitoring resources and to gather the necessary information for managing coastal rescue operations (if necessary).

Previously, the Governor of Finnmark took up the matter of existing problems in vessel notification practice directly with the commercial operators involved in tanker traffic and got some results. In the summer of 2003 he wanted the responsibility to be assigned to the Norwegian Coastal Administration, as the authority in charge. Today the Norwegian Coastal Administration, through the Vessel Traffic Centre, receives most of the notifications. These are forwarded to the military authorities for the respective use as stated above.

It should be emphasised again that the submission of notifications and reports requested by the Armed Forces is a voluntary, goodwill action. Vessels cannot be forced to submit such notifications and reports to the Norwegian authorities but most of them probably understand that this is also to their own advantage.

Returning from Russia with cargo

When vessels appear on AIS (Automatic Identification System), on the coastal radar picture or are observed by coastguard vessels or others, RHQNN notifies the NO NJHQ, vessels in tugboat readiness service, other military vessels and Norwegian Coastal Administration. The latter is also informed via AIS.

If the vessel has not sent out a notification message and/or lacks the information fax, RHQNN will establish communication with the vessel for information exchange.

Southbound transit along the coast

The operators at RHQNN and NO NJHQ will register position course and speed of the vessel at least every 30 minutes. The vessels are requested to report position and status to respective headquarters every 12 hours. When crossing 65 degrees north, RHQNN sends an update to NO NJHQ about the vessel's status and this headquarter will take over tracking of the vessel from then on.

Figure 4.46 In autumn 2003 the coastguard carried out constant monitoring in the area of Røst-Varanger. The monitored area is divided into three zones. The coastguards place their vessels in two zones while the Norwegian Coastal Administration position *Skandi Beta* to attend to the third zone. The photo shows *Skandi Beta* in Zone 1, Vardø - North Cape.

RHQNN and NO NJHQ regularly send out information about the status of a vessel to the Coastal Administration, vessels in the tugboat readiness service and other military units.

If there is an engine failure or a sudden course/speed change that cannot be logically accounted for in respect to normal sailing mode, RHQNN, NO NJHQ or the Vessel Traffic Centre will contact the vessel directly and request explanations. If it appears that the vessel is in trouble or lacks its seafaring safety integrity, a tugboat or another vessel can be ordered to assist the vessel or to follow it. Based on experiences so far, the chances for such developments are quite low.

The vessels are tracked or followed to the limits of the Norwegian Economic Zone.

Other actions carried out by the Norwegian Coastal Authorities in response to the threat

In addition to the actions described above, two measures have been implemented in order to reduce the chances of or limit the affects of a possible environmental disaster connected with the oil traffic. Both are responsibilities of the Norwegian Coastal Administration.

The first measure eventually carried out was the establishment of the state tugboat readiness service in the area of Røst-Varanger. This was done in the autumn of 2003 by positioning three tugs in three zones. The coastguards place vessels in two zones while the Norwegian Coastal Administration position the Skandi Beta to attend to the third zone.

The other measure was the establishment of traffic separation zones in the area of Vardø-North Cape. The zones were allocated on January 1st 2004, together with the expansion of the territorial waters to 12 nautical miles. The regulations oblige vessels according to the defined criteria (including tankers) to follow the traffic separation zones if they want to sail in Norwegian territorial waters. The purpose of the traffic zones is to reduce danger of vessel collision.

In addition to these actions, the Norwegian Coastal Administration has decided to build a traffic centre in Vardø, which in the long run will take over the functions of oil traffic monitoring and tracking now carried out by the Norwegian Armed Forces. The centre will start operating in 2007.

Monitoring system experiences

The Norwegian authorities wish that the majority of the vessels passing along the coast comply with the requests imposed on sailing routes and preliminary notification procedures. That is to say: no vessel should sail inside 12 nautical miles of the coast. There is still much to be done in respect of preliminary notifications from the approaching vessels but the number of vessels that comply is growing. The Armed Forces and the Norwegian Coastal Administration remain in good dialogue with the vessels and do not interfere unless there is a need to do so.

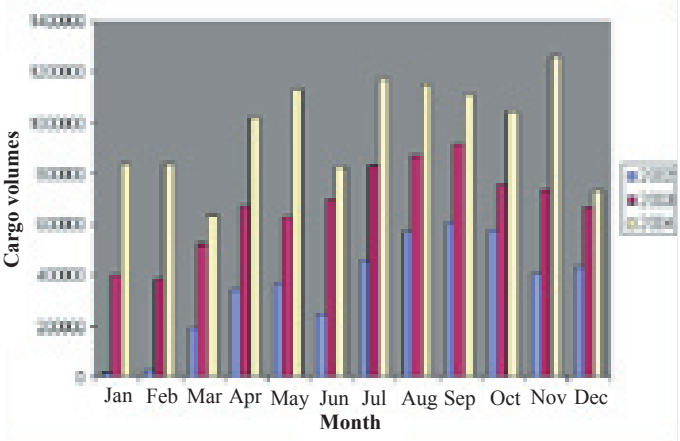


Figure 4.47 Monthly cargo volumes from the Russian part of the Barents Region that is transported through the Norwegian Economic Zone during 2002, 2003 and 2004. The data are collected and processed by RHQNN.

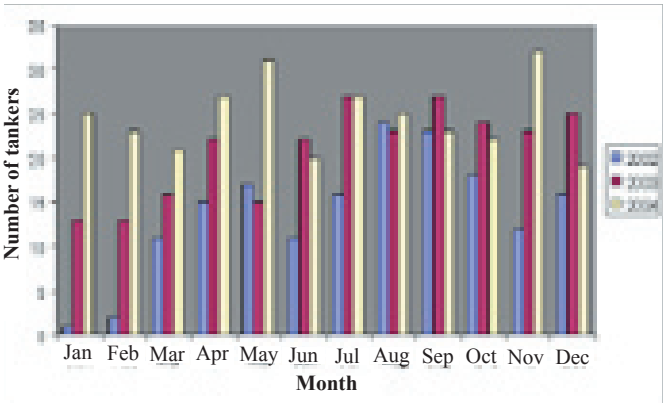


Figure 4.48 Number of cargo carrying vessels from the Russian part of the Barents Region that pass through the Norwegian Economic Zone during 2002, 2003 and 2004. The data are collected and processed by RHQNN.

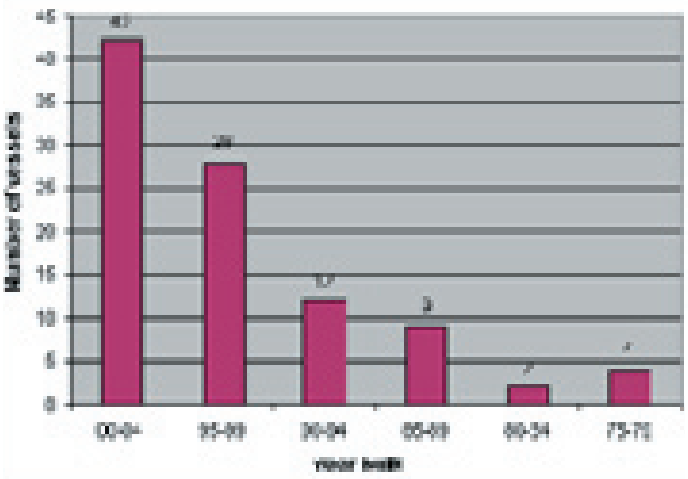


Figure 4.49 The year of build of vessels in the oil traffic. In 2004, the coastguard has registered 101 vessels making 295 passings. Most of the ships carrying oil from the Russian part of the Barents Region that pass through the Norwegian Economic Zone are newly built. The data are collected and processed by RHQNN.

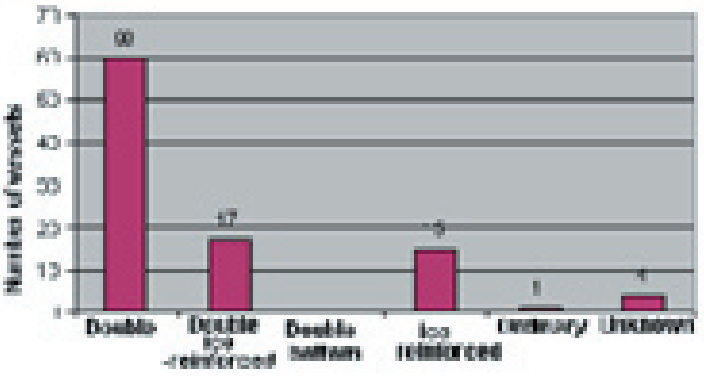


Figure 4.50 The hull types of the ships carrying oil from the Russian part of the Barents Region. Only one ship with a single hull was registered in 2004. The data are collected and processed by RHQNN.

So far there has not been any incident with a tanker from Northwest Russia that has led to environmental damage. In two cases (Kaliningrad and Moscow) certain measures were taken to prevent the possible damage. In both cases, the vessels managed to make way themselves.

Traffic and cargo volume growth

The Norwegian Defence, as mentioned before, has been tracking the oil traffic since 2003.

The tracking activities have generated a large amount of data about traffic volume, cargo amounts and vessels participating in transportation. These data are systematized so they can be used to assess, for example, needs of salvage service and traffic zoning. The data for 2002 have also been available. Together with the available data it has given a good perspective of oil traffic trends from the point of view of coastal emergency response system.

Cargo volumes

The monthly cargo volumes have grown (Figures 4.47 and 4.48). The total amount transported in 2002 was 4 266 700 tons of oil products, in 2003 - 8 084 500 tons and in 2004 the amount was 11 751 906 tons. In 2004 the total number of vessels with cargo over 100 000 tons doubled in comparison to the previous year because it proved to be cost effective to use such type of vessels. The anchorage of terminal ships Belokamenka and Trader in the Kola Bay has increased the uploading efficiency and intensified the use of both the shuttle tankers that operate along the Kola coast and freight tankers that come from Europe for oil cargo. Most of them carry crude oil, next in volume is fuel oil followed by gas condensate.

Number of vessels

The number of cargo carrying vessels has been growing gradually. In 2002, the number was 166 vessels, in 2003 - 250 vessels while in 2004 295 vessels transitted with cargo. It is worth mentioning that the number dropped somewhat in the second half of the year accompanied by growth in cargo volumes in the same period of time. The reason for the growth, as it was already mentioned, was the installation of two storage tankers in the Kola Bay.

Originating ports

The overwhelming majority of cargo goes directly to the continent from Murmansk and Arkhangelsk. From Murmansk, it is mostly crude oil that is loaded in harbors in the White Sea and further east. From Arkhangelsk the cargo is mostly refined oil and oil-related products such as fuel oil, gas condensate, kerosene, aviation fuel. In 2004, we have noticed more direct shipments to the continent from Vitino, Varandey, the Ob Bay and Dudinka.

Destinations
The vast majority of vessels sail to Rotterdam. The rest go to harbours around the North Sea and the English Channel in Germany, the Netherlands, Belgium, Great Britain, and France.

There has been some oil traffic from Russia to USA. So far the Norwegian Armed Forces have registered only three freights to USA - to Portland (Maine), Galveston (Texas) and one shipment to one unspecified harbour in "the US Gulf". There is reason to believe that this kind of traffic will pick up in the future when the shipping infrastructure on the Russian side has sufficiently improved, especially through the construction of an oil pipeline to Murmansk.

In addition to the already mentioned countries we have registered transport with destinations in Norway, Sweden, Finland, Spain, Canada, Italy, Morocco, Aruba, Portugal and the Faroe Islands.

Vessel specific - countries of origin
By the end of 2004, we have registered 101 different tankers in the oil traffic. They were under 19 different state flags with the greatest number being Liberia-registered vessels (23). 12 vessels under the Russian flag also appeared in the traffic. Norway was represented by seven vessels (all NIS registered).

Vessel standard
The fleet of ships carrying oil from Northwest Russia is new. 70 out of 97 vessels in 2004 are 10 years old or newer.

Almost all vessels carrying oil from harbours in Northwest Russia have a reinforced hull. There has been so far only one ship with a single hull. Of the four vessels that are listed as vessels with an unspecified hull type, two most likely have a double hull and the other two ice- reinforced hull.

Summary and conclusions
Oil traffic from Northwest Russia is increasing rapidly, especially in the amount of transported oil. There is a growing number of countries that get the oil from Northwest Russia and a growing number of countries that send their ships to transport oil from there. This shows that oil shipping from this area is gaining a more important international status. The weak link today is the infrastructure that hinders the oil flow to the export harbours. This problem solved, it will be more cost effective to use even larger size tankers than now and the long expected traffic to USA will become reality.

The vessels used in the traffic are mostly new and generally advanced in shipping technology. Various sea accidents in the last few years have resulted in respective revision of international requirements to sea vessel standards and these regulations seem to have been implemented by major actors in oil transportation from Northwest Russia.

5. Environmental aspects

The articles about the environmental policies in Russia and Norway are based on the official documents of the Russian and Norwegian environmental authorities, the Russian Ministry of Nature Resources, the Norwegian Ministry of the Environment and Ministry of Fisheries and Coastal Affairs. The information about oil pollution prevention systems in Russia and Norway was presented by the responsible oil spill prevention and response authorities and institutes. The articles about environmental problems are based on the reports and articles published by national and regional informational agencies, local newspapers, and environmental NGOs.

5.1 ENVIRONMENTAL POLICIES AND ACTIVITIES

5.1.1 Russian Environmental Policy

Ministry of Nature Resources of The Russian Federation is the main authority responsible for environmental protection and nature resources management in Russia.

In August 2002, the Government of the Russian Federation approved the "Ecological Doctrine of the Russian Federation", worked out by Ministry of Nature Resources.
The ecological doctrine is the main document defining the state policy of the Russian Federation, its goal, directions, objectives and principles for the long-term period. Hereafter we publish the main principles of the "Ecological Doctrine of The Russian Federation".

The strategic goal of the state ecological policy
According to the Ecological Doctrine the strategic goal of the state ecological policy is preservation of ecosystems, maintenance of their integrity and vital functions for sustainable development of the society, improvement of living standards, improvement of public health and the nation's demographics, and maintenance of the country's ecological safety.

The state ecological policy is based upon the following main principles:

- Sustainable development provides equal attention to economic, social and ecological components and recognizes that further human development is impossible without rational nature management;
- Equal access to the nature resources and fair distribution of benefits from use of nature resources;
- Preventive actions against negative environmental impact of various kinds of economic activities;
- Abandonment of all economic and other projects if their environmental consequences cannot be predicted at present or if they lack sufficient reliability;
- Due compensation for use of natural resources and fair compensation for damage to public health and environment;
- Free access to ecological information;
- Public, private and civil stakeholders' involvement in planning process related to preparation, consideration, approval and completion of plans in environmental protection and rational nature management.

The main directions of the state ecological policy
According to the Ecological Doctrine, the main directions of the state ecological policy are: preservation and restoration of the natural environment; sustainable nature management; contamination and pollution reduction, resource-conscious use of natural resources.

In order to achieve sustainable nature management it is necessarily to:

- introduce complex nature management and coordinate it with sustainable development goals, including ecologically proved methods of use of land, water and mineral resources;
- reduce the number of companies exploiting natural resources; to develop high-tech-based industries and environmentally friendly technologies;
- maintain and preserve biological resources diversity, their internal structure and reproduction ability;
- provide technologically exhaustive use of extracted minerals and biological resources, to minimize waste at extraction and processing stages;
- reduce harmful environment impacts and restore land damaged during exploration and development of minerals resources fields;
- preserve traditional environmentally balanced human activities;
- prevent and eliminate all kinds of illegal use of natural resources.

Ecological safety of the country
The Ecological Doctrine stated the main principles of the ecological safety of the Russian Federation, among them was the prevention and reduction of the environmental impact of emergency situations of natural and industrial characters.

The Ecological Doctrine stated that in order to identify and minimise ecological risks for the environment and public health

Figure 5.1 The Kandalaksha zapovednik (strict nature reserve), located in the western part of the White Sea, was established in 1932. The Vitino oil terminal is located near the protected area and all the ships that call at the port of Vitino have to pass close to the protected islands. The Vitino oil terminal operates all year round.

connected to emergencies, it is necessary to:

- foresee and identify potential ecological threats, including assessment of natural and human activity factors of emergencies with negative ecological consequences;
- develop and carry out risk reduction measures in emergencies with negative ecological consequences;
- prioritise public interests, and environmental integrity when developing new industries;
- organise public training in emergency response actions and behaviour; to provide ecological disaster awareness for effective civil defence;
- develop and modernize public protection devices and materials for effective protection in emergency situations with negative ecological consequences.

Ecological policy implementation

The Ecological Doctrine designates the major ways and means of implementing the state ecological policy, namely:

- Development of state nature protection and nature management system;
- Legal and regulatory support and enforcement
- Economic and financial resources;
- Ecological monitoring and information support;
- Research and scientific assessment;
- Ecological education and training;
- Development of civil society as a condition of implementing the state ecological policy;
- Regional ecological policy;
- International cooperation.

5.1.2 Norwegian national environmental policy

The Norwegian national policy on nature protection is worked out by the Ministry of the Environment. Environmental policy in the context of this report will mainly concern the Ministry of the Environment, and the Ministry of Fisheries and Coastal Affairs.

Here we present some information in respect to the Proposition to the Storting #1 (2004-2005), acquired from the two mentioned ministries that represent the national environmental policy and management, and relate to the oil transportation along the Norwegian coastline.

Ministry of the Environment

Good environmental management is crucial for welfare and progress of both industrialized and developing countries. Therefore, the environmental policy is an essential element for comprehensive and long-term development strategy.

The national environmental policy must be beneficial to sustainable development, in accordance with the action plan for National Agenda 21 presented by the Norwegian Government in 2004. The Government pays special attention to fulfilling Norway's duties in compliance with the decisions of the World Summit in Johannesburg in 2002.

The Government has declared a more comprehensive and ecosystem-based management of the sea, coastal areas and rivers. Together with other ministries the Ministry of the Environment develops a broad management plan for Lofoten and the Barents Sea.

The Governmental proposal to expand the territorial limit from 4 to 12 nautical miles was approved by the Parliament in 2003 and gave the country the possibility to keep ship transport further away from the coast. The Government considered it as an important measure, especially in the light of the increased oil traffic from Russia. In its report on the sea environment the Government declared more comprehensive and ecosystem based management plans for all the Norwegian marine areas. The main objective of these protection plans is to establish framework regulations that will allow balancing economic interests of fisheries, sea transportation operators and oil industry according to the sustainable development principles.

Introduction of alien and harmful species via release of untreated ballast water from ships near the coast can incur serious damage to marine ecosystems and livestock. The International Convention on ballast water was approved by International Maritime Organisation (IMO) in February 2004. The Government gives the highest priority to ratification of the Convention and integration of the Convention into the Norwegian legislation.

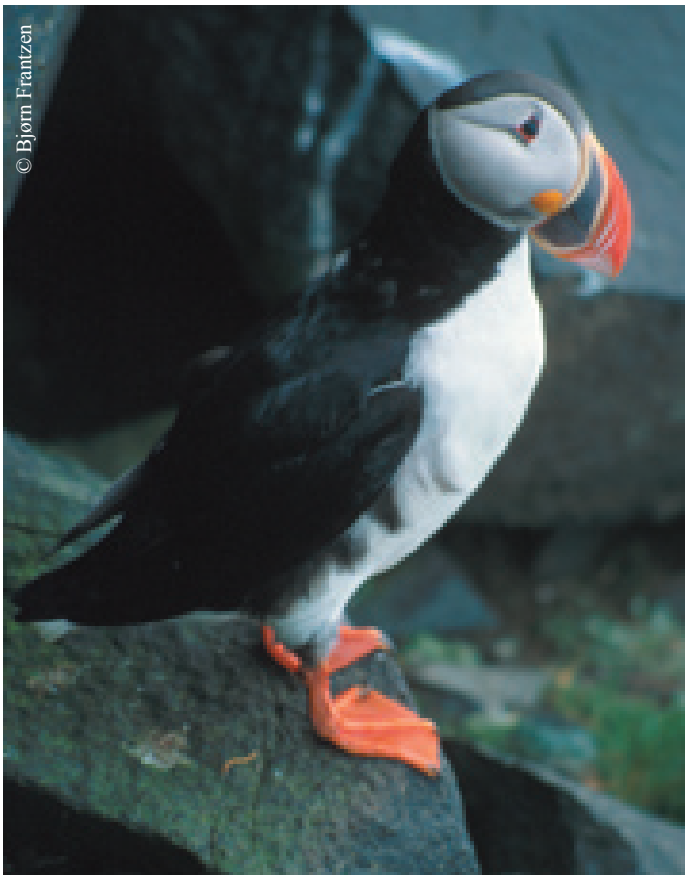


Figure 5.2 The Atlantic puffin (*Fratercula arctica*) is one of the seabird species that suffer from oil spills. Hopefully the Vessel Traffic Centre at Vardø will include biological data when they coordinate the sea traffic.

The Barents Sea, clean and rich in fish, is under pressure, especially from the increased oil transportation. In the bilateral environmental cooperation with Russia among other things, Norway is particularly trying to ensure a sustainable management and protection of the Barents Sea.

The strategic goal in terms of Parliamentary Proposition for the Ministry of the Environment in the section "Oil pollution" is to ensure water quality in fresh water basins and marine areas, in order to support species and ecosystems and to pay special attention to health and well being for the people.

The working goal number 1 stated: operational release of oil and environmentally hazardous substances from petroleum activities into the sea must be stopped or minimized before 2005 (zero release).

The most important source of oil pollution from oil industry is produced water. In 2003, the responsible authorities registered the release of 2361 tons of oil contained in produced waters from petroleum industry. However, accidental oil spills from petroleum activities grew steadily from 100 tons in 2002 to 737 tons of oil in 2003. This sharp increase resulted from a single acute spill of 638 tons of oil.

The working goal #2 stated: before 2006 there must be created a system to make sure that the pollution regulations for sea transportation are observed in accordance with regulations imposed by relevant sector authorities.

Illegal releases from ships represent the main challenges. In 1998, the North Sea was declared to be a special area under MARPOL 73/78 Convention Supplement on oil pollution from ships.

This implies stronger discharge regulations than general standards for release of oil from ships.

Via its own monitoring system, the Norwegian Coastal Administration identified approximately 74 unauthorized incidents of oil discharge from ships in 2003 compared to 95 in 2002. In volume the discharge amounts to at least 165 cubic metres (140 tons) of oil in 2003 against 142 cubic metres (121 tons) in 2002. It is generally assumed that such discharges are invariable under-recorded. Cooperation between the North Sea countries aims at more efficient legal actions against illegal discharge of pollutants from ships.

The strategic goal for environmental management in northern and polar areas stated: Norway through international cooperation will make efforts to improve the environmental situation in the Norwegian northern territories and the Arctic Region. Norway will ensure that the adjacent arctic sea areas are protected as the cleanest regions in the world, and use of the resources is developed within rules that can ensure preservation of the biological diversity in the region in the short- and long-term perspective.

Ministry of Fisheries and Coastal Affairs

The goal for international environmental cooperation of the Ministry of Fisheries and Coastal Affairs stated in the Parliamentary Preposition, is to develop and employ international agreements against acute pollution in terms of reciprocal assistance and coordination in order to provide optimal use of available resources.

The Norwegian Coastal Administration manages a wide range of agreements with other countries concerning mutual assistance in cases of acute pollution. Among other existing agreements, the Russian-Norwegian agreement on mutual assistance in acute oil spill response in the Barents Sea should be mentioned.

The cooperation between Russian and Norwegian authorities is developing in the areas of sea transportation safety and oil spill prevention and response in the northern regions. Among other things, they are working on developing a mutual notification and information system for oil transportation in the Barents Sea and along the Norwegian coast. A steering committee and two working groups were created to coordinate the work. One working group concentrates on monitoring oil transportation, establishing the early warning system and coordination of tug and salvage capabilities in the region. The other working group among other things is working on revision and further development of the existing bilateral Norwegian-Russian agreement on joint contingency plan for combating oil pollution in the Barents Sea. They are also involved in development of emergency response plans and oil spill prevention and response exercises in Arkhangelsk and Murmansk Regions. The parties started technical cooperation in developing different types of oil pollution prevention equipment.

5.1.3 Petroleum companies environmental policy

Here we publish the examples of the environmental policy documents of the large Russian and Norwegian petroleum companies that are working internationally and have certain interests in developing petroleum production in the Barents Region.

Lukoil's Environmental Policy

Lukoil's strategic goal for the 21st century is to secure stable growth and to become one of the world's leading oil companies. The goal can be achieved through a well-balanced solution of social, economic and environmental protection assignments.

Lukoil realises its responsibility to the nation for environmental safety, and rational use of natural resources. The Company relies on people's understanding of the complexity and range of problems it is facing in this sphere.

Lukoil's priority objectives are health protection and safety of personnel and communities in the areas where Lukoil operates and manages natural resources.

To achieve this, industrial/occupational/environmental safety systems have been created and are successfully operating within the Company. They fully comply with the existing legislation of the Russian Federation and are based upon best domestic and international practices and are certified in conformity with ISO 14001 and OHSAS 18001.

The policy has been developed and is in line with the state strategy in the area of industrial/occupational/environmental safety and rational management of natural resources.

Lukoil sets out the following goals in the coming 5 years:

- permanent improvement of industrial/occupational/environmental safety and control over these commitments;
- rational management of natural resources involved in commercial production in the areas where the Company operates;
- achieving a level of industrial/occupational/environmental safety conforming to the current state of scientific, engineering and social development;
- improving the industrial/environmental safety of the Company's production facilities, minimizing an adverse impact on the environment through raising their reliability, ensuring both safe and trouble-free operation of process equipment;
- setting efficient patterns for preparation and implementation of industrial/occupational/environmental safety programs which ensure permanent identification and solution of increasingly more important industrial/occupational/environmental safety assignments faced by the Company;
- stabilisation followed by reduction of toxic emissions and discharge with increased production output through application of innovative, state-of-the-art technologies, equipment, materials and improvement of automation control level;
- reduction of environmental stress caused by newly commissioned facilities by improving the preparation quality of (pre-)project documentation and its environmental and industrial safety assessment in Lukoil;
- efficiency improvement of inspection for industrial safety and environmental monitoring at the Company's facilities through application of modern information technologies, diagnostic engineering and remote probing.

Figure 5.3 "Lukoil's strategic goal for the 21st century is to secure stable growth and to become one of the world's leading oil companies. The goal can be achieved through a well-balanced solution of social, economic and environmental protection assignments", from Lukoil's environmental policy.

To attain these objectives, Lukoil is committed to the following:

- to implement a range of preventive measures aimed to preclude any emergency and mitigate impact on the environment;
- to prioritise actions and measures, projected and under implementation, aimed at preventing an adverse impact on the environment, personnel and population.
- to strive for persistent improvement in the figures measuring the influence of such activities, products and services on the environment, personnel, population and natural resource consumption in line with contemporary level of scientific, engineering and social development;
- to work in a permanent and target-oriented manner to mitigate crude oil/oil product losses and their penetration into the environment;
- to apply state-of-the-art scientific developments and techniques for gradual reduction of per unit consumption of natural resources, materials, energy while maintaining the maximum production output;

Figure 5.4 This is how the land installation of Statoil's Snøhvit project appeared at Melkøya, Hammerfest, in November 2004.

- to ensure compliance with the federal, regional and local legislation, international treaties, industry and corporate standards regulating oil companies' activities in the area of industrial/occupational/environmental safety;
- to approve and implement any managerial and operational resolutions with due regard to the whole range of environmental aspects of projected activities, products manufactured and services rendered;
- to assess the impact of any proposed activities, products and services on the environment, health of personnel and population;
- to develop and implement programs aimed at reduction of extraordinary losses from activities from companies of the Lukoil Group;
- to assess industrial and environmental risks, to develop and implement measures aimed at mitigation of those risks, and compensate losses resulting from those risks;
- to strive for continuous improvement in the quality of environment in the areas where the Company operates;
- to implement its activities in the area of industrial/occupational/environmental safety in compliance with international standards;
- to demand from the Company's contractors that they apply the same standards of industrial/environmental safety and labour/health protection as accepted by the Lukoil Group;
- to ensure a pro-active involvement of the Company personnel in industrial/environmental/occupational safety and energy-saving activities. To attain these objectives, the Company is to develop relevant incentives and training for its personnel and companies of the Lukoil Group;
- to inform on a regular basis all interested parties (public, executive authorities, etc.) of the Lukoil Group's industrial/environmental safety performance;
- to revise, adjust and improve, as required, the Company's industrial/occupational/environmental safety policy;
- to inform the Company personnel, public, executive authorities and other interested parties of all the changes in the industrial/environmental safety policy of the Company;
- to report in public to shareholders, Company personnel and public on its activities in the area of health/labour/environmental safety;
- to demand from all the personnel of the Lukoil Group to perform in compliance with the existing safety standards and labour/environmental protection rules.

Statoil's environmental policy

Zero harm

All Statoil activities, from exploration for oil and gas through construction and operation of facilities to end use of its products, affect the environment. The impact may be due to emissions, discharges or land use threatening biodiversity or cultural heritage.

Impact on the environment is determined by state and capacity of the area affected, type of activity, technology applied and operational standards.

Statoil recognizes that its activities may sometimes harm individual organisms, but this does not mean a failure to conserve biodiversity.

The following text defines what Statoil means by zero harm to the environment and summarizes Statoil's policy, corporate targets and minimum standards in this area.

Definition of zero harm to the environment:

Conserving biodiversity;

- no habitat destruction;
- no introduction of foreign species;
- no effects on population level.

Limiting emissions and discharges

- emissions and discharges to be below the critical level of relevant ecosystems.

Limiting land use

- restore and clean used areas when activity is completed;
- conserve landscape and cultural heritage.

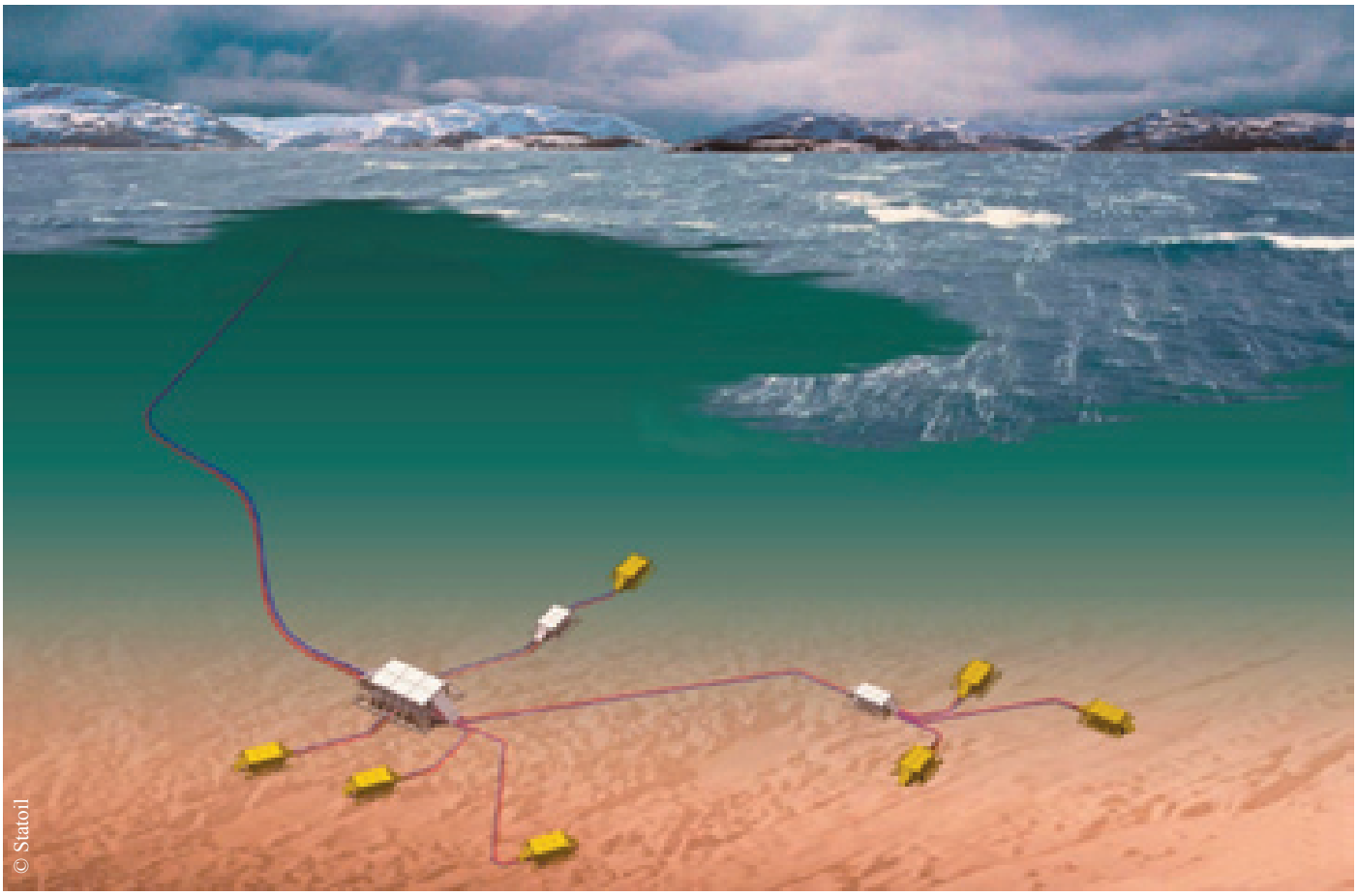


Figure 5.5 "All Statoil activities, from exploration for oil and gas through construction and operation of facilities to end use of products, affect the environment", from Statoil's environmental policy. The figure shows the Snøhvit pipeline system on the seabed in the Barents Sea.

Environmental policy

Statoil will:

- act according to the precautionary principle;
- minimize impact on the environment, whilst continuing to address health, safety and economic issues;
- comply with applicable legislations and regulations;
- continuously improve its energy efficiency, environmental performance and products;
- set specific targets and improvement measures based on relevant knowledge of the area affected, and by applying risk analyses to assess environmental and health effects;
- consult and cooperate with relevant stakeholders and strive for solutions acceptable to all affected parties;
- make the policy available to the public, openly report the company performance and use a competent and independent body to verify the reported data;
- seek to make the best possible utilisation and use of natural resources;
- contribute to the reduction of Green House Gases (GHG) by reducing relevant emissions from our activities and by participating in emission trading and utilizing project based mechanisms;
- prepare for a carbon constrained energy market and engage in the development of non-fossil energy sources and carriers.

Corporate standards

Corporate targets and minimum standards

Greenhouse gases (GHG) – target

Statoil's target is to achieve, by the year 2010, an annual reduction of 1.5 million tons of CO_2 equivalent on equity basis. Results will be calculated by assessing the amount that would have been released if no special measures had been taken, and by comparing that figure against actual performance.

Chlorofluorocarbons (CFCs) and Halons

Statoil's target is to eliminate chlorofluorocarbons (CFCs) and

halons from the company operations. All new systems shall be CFC/halon free and existing CFC or halon-based units shall be replaced with CFC/halon free systems wherever alternative systems are reasonably available.

Chemicals
Statoil's target is to eliminate use and discharge of hazardous substances (substances or groups of substances that are toxic, persistent and liable to bioaccumulate). Chemicals containing hazardous substances may only be used if technical or safety performance is jeopardized, still the environmental risk should be minimized.

Monitoring
Before operations begin in a new area, the status of the affected environment must be surveyed, followed by monitoring of critical parameters revealed in the Environmental Impact assessment (EIA) during operation. This EIA shall be closely linked to the Social Impact Assessment.

Best Available Techniques
The best Available Techniques (BAT) shall generally be applied. Operating units/projects shall document their specific choice of BAT. Guidelines for selection of BAT may be found in NORSOK S-003, World Bank guidelines (onshore and offshore) and EU IPPC BREF documents.

Production flaring
Statoil do not accept permanent production flaring i.e. continuous flaring for gas disposal.

Transportation by sea
Vessels shall be vetted according to Statoil vetting procedure and vessels over 5000 tons deadweight carrying heavy fuel or similar products as cargo must have double hull.

Waste
Waste shall be regarded as a resource and treated in the following order of priority: re-use, recycling, energy recovery and deposit of residual waste. Waste sorting shall be based on regional opportunities for further treatment of the various fractions. Volumes of waste shall be registered in an environmental accounting system.

5.2 OIL POLLUTION PREVENTION AND RESPONSE IN RUSSIA AND NORWAY

5.2.1 Oil Spill Prevention and Response in Russia

The oil spill prevention and response (OSPR) measures in Russia are to be carried out according to local, regional and federal OSPR plans, which are developed according to norms and regulations of the Russian Federation. The Government of the Russian Federation approved two major OSPR documents named "Main requirements for oil spill prevention and response action plans" and "Rules of organising measures of oil spill prevention and response on the territory of the Russian Federation" (No. 613 08.12.2000 and No.240 15.04.2002).

Here we publish the extracts from these "Main requirements for oil spill prevention and response action plans" (hereafter Main Requirements) and "Rules of organising measures of oil spill prevention and response on the territory of the Russian Federation". In particular, the Main Requirements state that:

Oil and oil-related products spills are classified as emergency situations and attended to according to the legislation of the Russian Federation.

Depending on volume of the oil and oil products spill and space of the affected areas in internal fresh-water reservoirs, emergencies are allocated in the following categories:

- locally significant spills from the lowest level (the lowest level is determined by the authorised federal environmental authority) up to 100 tons of oil and oil products on the affected territory;
- municipally significant spills from 100 up to 500 tons of oil and oil products within the limits of administrative borders of a municipality, or spills up to 100 tons of oil and oil products outside the borders of the municipal territory;
- territorially significant spills from 500 up to 1000 tons of oil and oil products within the administrative borders of the Russian Federation subject, or spills from 100 up to 500 tons of oil and oil products outside the administrative border of a municipality;
- regionally significant spills from 1000 up to 5000 tons of oil and oil products, or spills from 500 up to 1000 tons of oil and oil products outside the administrative borders of the Russian Federation subject;
- federally significant spills of more than 5000 tons of oil and oil-related products or spills with disregard of the spilled amounts coming across the state border of the Russian Federation, as well as oil and oil products spills incoming from the adjacent territories of bordering states (trans-border significance).

Depending on volumes of oil and oil products spills, emergencies at sea are allocated into the following categories:

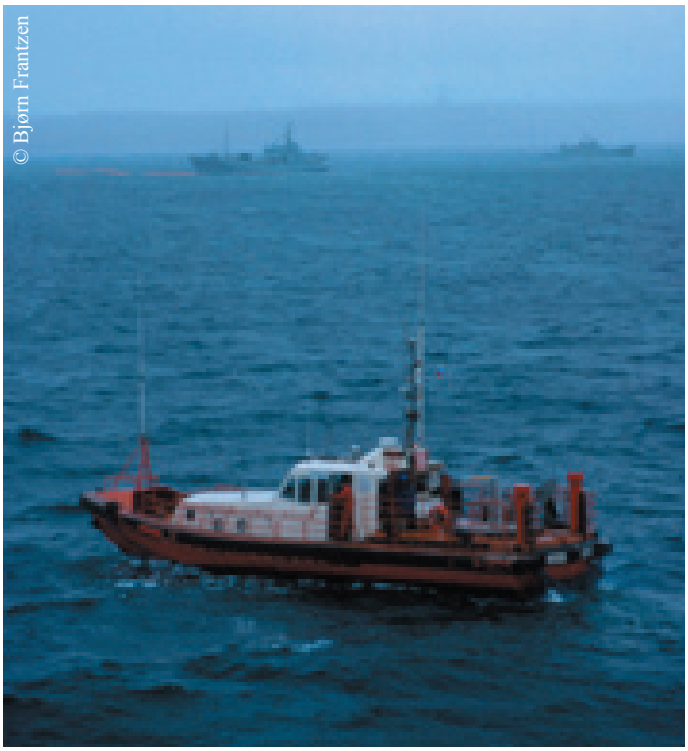


Figure 5.6 The *Markab* and two Norwegian coastguard vessels during an exercise outside the Poluostrov Rybachiy (Fiskarhalvøya) in 1999. Norway and Russia have annual exercises to be better prepared for joint actions when a big oil spill appears in the border areas.

- emergency of local significance – spills of oil and oil products from the lowest level (the lowest level is determined by the authorised federal environmental authority) up to 500 tons of oil and oil-related products;
- emergency of regional significance – spills from 500 up to 5000 tons of oil and oil products;
- emergency of federal significance – spills in amount more than 5000 tons of oil and oil products.

Depending on the location of the spill and the meteorological conditions the emergency can be given a higher priority and significance status.

According to the Main Requirements, the oil spill prevention and response (OSPR) plan should provide:

a) forecasts of potential oil spills;
b) a number of personnel and equipment sufficient for efficient OSPR measures (hence called personnel and equipment), the adequacy of the personnel and equipment available onsite to conduct OSPR measures and a possible need for professional rescue units;
c) personnel interaction system;
d) structural description and disposition of personnel and equipment;
e) management, communication and notification;
f) training and alert maintenance of personnel indicating authorities responsible for training and alert maintenance;
g) information exchange system for the all the participants of OSPR measures;
h) prioritised action plan upon emergency notification;
i) geographical, navigational, hydrographical, meteorological and other features of the emergency oil spill relevant for OSPR management and operations;
j) public safety management and medical aid;
k) action plan of OSPR operations;
l) technical and financial resources and supplies management for OSPR operations.

The Main Regulations, in particular, state that when calculating necessary personnel and equipment one should take into account that the time of oil spill localisation should not exceed 4 hours offshore and 6 hours on land.

The OSPR plan for marine areas at the Russian federal level is developed by the federal bodies and authorised by the Ministry of Transport, the Ministry of Emergencies and the Ministry of Nature Resources. The regional OSPR plans are developed by the organisations responsible for oil fields exploration, oil recovery, oil processing, oil transportation, oil storage as it is agreed upon by the executive bodies of the Russian Federation subjects, and authorised by territorial representatives of the federal Government.

The "Rules for organising measures of oil spill prevention and response on the territory of the Russian Federation" (hereafter the Rules) specify the requirements imposed on OSPR organisation and OSPR measures aimed to reduce negative impact of oil spills on the population and the environment. The organisation of OSPR operations is conducted by federal executive authorities, administrations of the Russian Federation subjects, local Administrations, and by the

organisations responsible for oil fields exploration, oil recovery, oil processing, oil transportation, and oil storage.

As is stated in the Rules, the organisations involved in oil exploration, recovery, storage, processing and transportation activities shall:

- create their own OSPR units carrying out necessary certification of the units' personnel as required by the regulations of the Russian Federation; equip the units with special equipment and resources or sign contracts with professional rescue units for OSPR services if the latter are officially authorised and licensed to perform such operations as required by law;
- immediately notify the respective state authorities and bodies of local administration about oil and oil products spills in order to organise OSPR operations in the location of the spill;
- have financial assets and other resources ready for oil spill localisation and immediate response measures;
- train their personnel in self-protection and actions under emergency situation conditions related to oil and oil products spills and;
- maintain and regularly service industrial equipment keeping it in due condition required for safe operations, carry out measures aimed at oil spill risk reduction and diminishing potentially harmful affects of oil spills;
- take measures providing safety of the personnel and health protection in case of oil spill emergency;
- develop the industrial safety declaration of high risk industrial installations;
- organise and carry out inspection of industrial safety conditions at high risk industrial installations;
- adjust and update OSPR plans upon initial data changes;
- hire authorised and certified personnel for operating high risk industrial installations and machinery;
- obtain licenses required for operating high risk industrial installations as stipulated by the legislation of the Russian Federation;
- create and maintain oil spill detection, notification and an early warning system.

As is stated in the Rules, in order to define the necessary structure of OSPR forces and special means at industrial installations, the operator shall conduct risk assessment of oil spills and consequent emergency situations resulting from them.

The plan of OSPR actions and measures should be based on risk assessment of the maximum possible volume of oil spills.

According to the Rules, the management of oil spill localisation and OSPR actions should be carried out by the emergency situation commissions and at sea by the specialised authorities. These operations should be carried out 24-hours a day in any weather conditions (at sea under allowable navigational and meteorological conditions).

The Rules specify that OSPR actions are considered complete after the following is done:

- oil or oil products release is terminated;
- spilled oil or oil products are collected to maximum achievable level as allowed by the available equipment;
- collected oil or oil products are stored for subsequent recycling thereby excluding secondary pollution of industrial installations and the environment.

The subsequent work of reducing impacts of the spill, subsequent rehabilitation of the polluted territories and water basins should be carried out according to the officially approved (by the state respective nature protection authorities) programs of land re-cultivation and restoration of water areas.

According to the Rules, the organisations, on whose territory the sources of oil pollution are found, should monitor the polluted area and its possible impact on living conditions of the residents, and if necessary to take measures to prevent the damage.

In addition to Main Requirements and Rules, the Ministry of Nature Resources of Russia issued an Order dated March 3rd 2003, where were set the bottom levels of oil and oil products spills for classifying accidental oil spill as an emergency situation. According to this order the bottom levels are:

- for the Arctic seas areas the volume is set at 0.5 tons of oil and oil products;
- for the estuary of Severnaya Dvina River the amount is 0.3 tons;
- for surface waters of different use the values are set between 0.5 and 1.5 tons;
- for land the values are from 0 to 40 tons depending on oil type and character of the territory.

The territorial units and Specialised Marine Inspection of the Ministry of Nature Resources of Russia should control oil spill response and oil pollution dissolving activities, in any case whether the oil spill was clarified as an emergency situation or not.

Russian Regional oil spill prevention units

The Specialised Marine Inspections under the Federal Service for Nature Use Control (Rosprirodnadzor) of the Russian Ministry of Nature Resources are the main state authorities carrying out environmental inspections of the offshore oil terminals, including expertise of the oil spill prevention and response plans.

The Nenets Specialised Marine Inspection in Naryan-Mar is responsible for the Pechora Sea; the Arkhangelsk Specialised Marine Inspection is responsible for the major part of the White Sea, and the Arctic Specialised Marine Inspection in Murmansk is responsible for the Russian part of the Barents Sea.

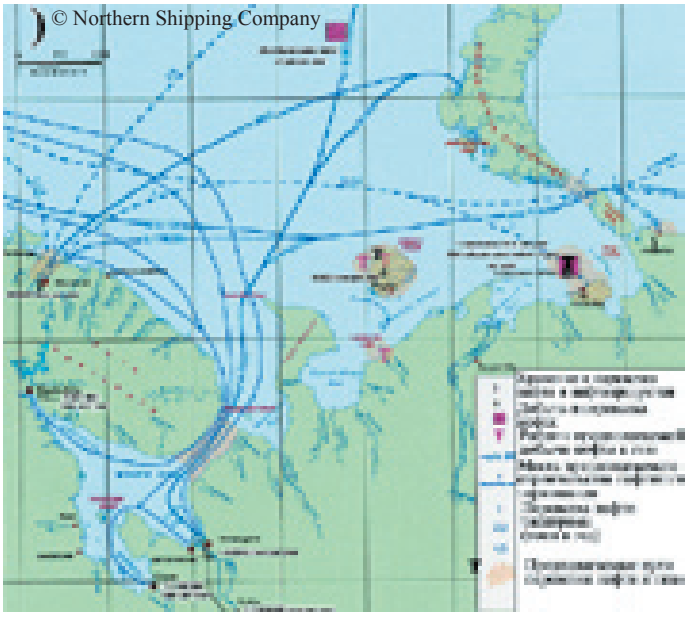


Figure 5.7 Oil transport routes in the southeastern part of the Barents Sea and the White Sea.

The main state institution for oil spill response operations in the sea in the Russian part of the Barents Region is the Murmansk Basin Emergency and Salvage Department.

Murmansk Basin Emergency and Salvage Department

Murmansk Basin Emergency and Salvage Department (MBESD) is a state enterprise under the Ministry of Transport of Russia. Its activities are coordinated by the State Marine Pollution Control, Salvage and Rescue Administration of The Russian Federation. MBESD has the head office in Murmansk and a branch in Kandalaksha, and is responsible for two state tasks in the sea – rescue and salvage operations, and oil spill response. The geographic area of responsibility of MBESD is bordered by N 60° latitude, E 120° longitude and the North Pole – from Greenland in the west to half of the Laptev Sea in the east. MBESD also runs commercial activities, like oil spill response services; towages; diving services; underwater technical projects; and offshore installations building and repair.

MBESD implements oil spill prevention and response activities during reloading and transshipment operations in Ob Bay, Varandey, Kolguev, and Kola Bay – RPK-1 of the Murmansk Shipping Company, RPK-2 of the White Sea Service, and RPK-3 *Belokamenka* of Rosneft.

MBESD is responsible in Russia for implementing the "Joint Russian-Norwegian Contingency Plan for the Combatment of Oil pollution in the Barents Sea", and has taken part in joint oil spill combating exercises every second year since 1994. MBESD also arranges regular exercises with oil terminal operators in the Pechora Sea, the Kandalaksha Bay of the White Sea and the Kola Bay of the Barents Sea.

MBESD and its personnel are attested for salvage and oil spill response operations. 33 employees passed the 1st level of IMO courses "First Responder", and 20 – the 2nd level "On Scene Commander" in 2003.

The vessels of MBESD: salvage tug *Agat* (deadweight – 445 tons, oil-in-water mixture capacity – 100 cubic metres, the year of construction 1976); supply vessel *Svetlomor-3* (780 tons; 625 cubic metres; 1987); supply vessel *Kapitan Martyshkin* (1370 tons; 550 cubic metres;

1987); local fleet – SBL *Markab*, *SRP-21*, *MPB-20*, *SPK-19/35*.

Among the big vessels of MBESD only *Agat* has worked on oil terminals in the Russian Arctic in recent years. Two other vessels, *Svetlomor-3* and *Kapitan Martyshkin*, have worked on commercial operations mostly in areas outside Russia due to a lack of federal funds.

Oil spill response equipment of MBESD includes: booms – BPP (1100 booms), Expandi (4300), Ro-Boom Ocean (2000), NOAS X-F 11 MK (3 systems); skimmers – Desmi-250, Foxtail VAB 2-4, Foxtail VAB 4-9, Lamor Minimax 10; emergency offloading systems – Framo.

Figure 5.8 The pier of Murmansk Basin Emergency and Salvage Department (MBESD) with their two ships *Agat* and *Markab*. Their geographical responsibility area goes from Greenland in the west to half of the Laptev Sea in the east, and north to the North Pole.

Arctic Skimmer Company, Murmansk

The Arctic Skimmer Company was founded in 2004 and attested as a salvage unit with the right to fulfil the following tasks: oil spill prevention and response; development, correction and examination of oil spill prevention and response plans; oil spill preparedness watch; and oil polluted water recovery. The operation area of the Arctic Skimmer Company is a western part of the Russian Arctic. Among 16 employees of the company, 8 are attested as rescuers who passed the 1st level of the IMO courses "First Responder" and other courses.

Oil spill response equipment of the Arctic Skimmer Company includes: boats VRB-1 and Sever-11; endless-track floating carriers (2 pcs); trailer with the storage for recovered oil; skimmers – Lamor Minimax 10 (3 pcs), Lamor Multi Skimmer DWD (1 pc), Ro-cleaner (2 pcs); cold and hot water units for oil outwash; sorbent Lessorb-Extra (200 kg); absorbing booms BSS-10U (300 metres), light booms B -10/600 (1000 metres); unit for oil-containing products utilisation Fakel; and other.

Specialised Unit for oil spill response in the Arkhangelsk port

Marine Specialised Unit for oil spill response (MSU OSR) was established in the Arkhangelsk port in January 2003 according to the decision of the Russian Ministry of Transport, and on the basis of the Northern Shipping Company department. The main goal for establishing MSU OSR is to secure preparedness for oil spill response, and to run oil spill response operations. MSU OSR was attested for oil spill response operations by the joint commission of the Ministry of Transport and the Ministry of Emergencies.

The staff of the unit consists of 4 engineering personnel and 9 rescuers. The employees passed the 1st, 2nd and 3rd levels of the IMO courses, and have experience of oil spill response operations in summer and winter navigation periods.

Oil spill response equipment of MSU OSR include: oil collection system; booms; oil trawl; ships – ice-breakers, service ships and boats; cargo vehicles; and other equipment.

Specialised oil spill response unit in Vitino port

Specialised unit for oil spill response was established in Vitino seaport in 2003. Before 2003, oil spill prevention and response services in Vitino were provided by MBESD on the basis of contracts with the Vitino port. Vitino OSPR unit has the following equipment: booms (1000 metres); skimmer; floating oil collector tank. In the water area of Vitino port in the Kandalaksha Bay they arrange regular oil spill response exercises with participation of Vitino OSPR unit and MBESD.

Specialised oil spill prevention and response unit of Rosneft-Arkhangelsknefteprodukt

The specialised unit for oil spill prevention and response of Rosneft-Arkhangelsknefteprodukt takes care of oil spill prevention and response operations at the oil loading terminal in Talagi. The unit has the following

Figure 5.9 In 2003 a marine control strike team was established and organised by the Northern Shipping Company (NSC). According to NSC, no oil combat preparedness was earlier established in spite of regular oil spills in Severnaya Dvina.

equipment: oil containers (2 items); booms (900 metres); skimmer; and boom-setter of DORI type.

5.2.2 Oil spill prevention in Norway

The preparedness of the state to handle acute pollution is designed to deal with large-scale pollution cases and is based on assessment of environmental risk – not on worst-case scenarios.

The Norwegian Coastal Administration runs a 24-hour continuous watch; it gets information, gives instructions and follows up 500-600 incidents of acute pollution every year. The Department of emergency response is entitled by the state to be responsible for emergency response in cases of accidental pollutions. The Department task is to prevent and identify accidental pollution, and see that the part of community responsible for pollution would carry out necessary actions when such pollution occurs. In Norway, the first choice in cleaning oil spill is a mechanical approach and to a minor degree a chemical treatment is considered.

Industrial activities involve substantial environmental risks so pollution regulations oblige companies to have adequate emergency response systems against acute pollution. The main objective of such systems is protection of life, health, environment and economic interests. The superior and established principle of pollution legislation is the polluter-pays-principle (PPP). This means that the company responsible for pollution must pay both the costs of establishing its own emergency response system and the costs of carrying out measures that would limit the hazards of pollution from its own activity. The polluting company is financially responsible for both cleaning and compensation of damage incurred to the environment and property.

Oil and chemicals represent a serious threat in respect to accidental pollution; oil and chemicals are produced and transported in Norway in great amounts. In 2002, Norway extracted about 164 million tons of crude oil on the continental shelf. About 15 millions tons of refinery oil products were shipped by sea or land. Oil spills in Norway are by all standards small in size. The situation of environmental threats is now characterized by growing oil transportation from the Russian part of the Barents Region along the coast of northern Norway together with the increased traffic from the Baltic Sea outside Skagerak. Norway including Svalbard and Jan Mayen has a coastline of 92 000 kilometres.

The most important emergency response tasks are to:

- carry out the stately functions in respect of emergency response system against acute pollution with preventive and operative measures – 24 hours a day, year round;
- identify, coordinate and develop awareness of the resources of the national emergency response system among private, communal and state entities;
- further develop the national emergency response system through organizing exercises, courses and training for personnel of state, communal and private emergency response organisations; development and testing of oil spill protection equipment together with environmental risk assessment and analysis of emergency response status;
- observe national and international agreements on notification and assistance;
- allow supervising authority to make the polluting party or community take action;
- apply legal actions to the polluting party for cleaning and environmental assessment in cases of acute pollution;
- invest in and maintain emergency response resources connected to the state installations and vessels with a role in the emergency response system;

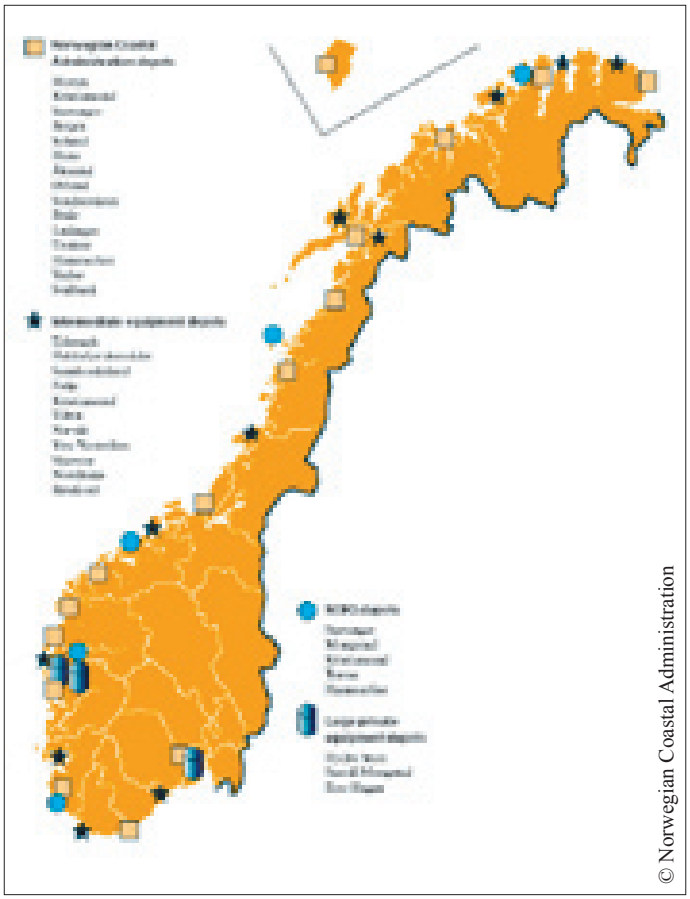


Figure 5.10 Oil combat equipment storages in Norway.

- take action against shipwreck

Preventive measures are the ground pillars in the Norwegian emergency response system against acute pollution. Some of them are:

- expanded territorial waters to 12 nautical miles from 2004;
- coordinated monitoring of sea traffic with the help of the Norwegian Coastal Administration vessel traffic services (VTS);
- introduction of AIS (Automatic Identification System) for ships with hazardous cargo;
- adequate salvage and tugging vessel assistance in the area north of 65° to the Russian border;
- regulated fairways;
- coordinated aviation and satellite monitoring of the coast and sea areas;
- mapping of refuge harbours and beaching locations.

Emergency response in private sector

Around 70 land-based industrial companies, including refineries and petroleum storage facilities have received special emergency response requirements from the State Pollution Control Authority and created emergency response plans. Oil companies on the continental shelf follow the regulations in compliance with health, safety and environmental regulations for oil industry. For the oil industry on the Norwegian continental shelf, there are special emergency response and action plans for each individual business operator. All operators are members of Norwegian Clean Seas Association for Operating Companies (NOFO) that provides materials and personnel for the emergency response units for the companies. All companies have the duty to attend to OSPR operations originating from their own activity or the duty of assistance to nation-wide or local actions.

Emergency response in public and local sectors

Municipalities have their own emergency response and action duties in case of minor incidents of acute pollution inside municipal borders that do not include private responsibilities or where the polluting party is unable to take action or the polluting party is unknown. Municipalities cooperate in emergency response activities through 34 cross-municipal regions that integrate all Norwegian municipalities.

Emergency response in the state sector

The Norwegian Coastal Administration on behalf of the state has the emergency response organisational and operational duties in major acute pollution accidents that are not covered by private or municipal emergency response responsibilities. In the main, this concerns measures against oil spills from ships and in shipwreck accidents or from unknown sources. In case the polluter is unable to take action, the Norwegian Coastal Administration, if needed, can take over. The Norwegian Coastal Administration has the responsibility for assisting ships that represent a potential threat of acute pollution, for example, with emergency towing and assistance to stranded ships. The Norwegian Coastal Administration works in close cooperation with the Norwegian Defence authorities, especially with the coastguards. The Norwegian Coastal Administration can also mobilise both private and municipal resources for a larger national emergency

Figure 5.11 In January 1979, a small oil spill outside Vardø led to great damage. The spill was so small that it could not be spotted. The timing for the spill was worst imaginable – the Varangerfjord was full of sea birds and more than 10 000 seabirds died, many of the oil polluted birds were Brünnich's guillemot *Uria lomvia* (picture).

response action. Through the international agreements on emergency response, it can also seek international assistance.

Action against pollution

Experience in Norway and other countries have shown that accidental oil spills in the sea near the coast in most cases involve oil spreading on the beaches. Therefore, it is very important to stop oil from spreading further on land with tide or water currents. The beach-based operations themselves will not lead to excessive damage to the environment if environmentally friendly methods of rehabilitation are made use of. Such actions can last from several days to several months and involve a large amount of people and material resources. Therefore, the oil protection measures are extremely costly.

Aviation and satellite monitoring

The monitoring planes of the Norwegian Coastal Administration patrol the Norwegian coast approximately 600-800 hours annually in cooperation with the coastguards. The radars and navigation equipment on the planes makes it possible both to detect and estimate the pollution sites. One satellite service is available through Kongsberg Satellite Service in Tromsø. Upon notification, the Norwegian Coastal Administration will send a special surveillance plane or a vessel to verify the information from the satellite.

Emergency response equipment in Norway

There is private, state and municipal equipment for emergency response actions against accidental oil pollution. The materials used for OSPR actions are divided into light, medium and heavy ones. In 2003, the state-owned equipment for such purposes had a total re-purchase value of about 400 million NOK.

Private materials:

- NOFO has 14 floating heavy oil skimming systems, each comprising of two vessels, 400-metre booms and a large oil skimmer;
- at offshore installations and petroleum storage facilities there are altogether more than 200 000 metres of booms and 50 oil skimmers.

Municipal and joint municipal resources:

- approx. 70 000 metres of light boom and approx. 300 oil skimming devices.

State-owned resources:

- 9000 metres of light boom;
- 22 000 metres of middleweight boom;
- 12 000 metres of heavyweight boom;
- 130 oil skimmers;
- 8 coast surveillance vessels and 4 OSPR vessels with booms and oil skimmers.

The risk of oil spills in Northern Norway originating from oil transportation from the Russian part of the Barents Region

Discharge that follows the wreck of a beached tanker with oil cargo will be the most important cause of potentially large oil spills from oil transportation in the area in question. Collisions involving tankers can also result in accidental oil spills. It must be noted that the probability of such disasters is low. For example, the return period for another tanker wreck with a potential spill of 120 000 tons of oil for the whole area was in 2003 2000 years. By return period we mean the period before the next wreck of such dimension is likely to occur.

In conclusion, it can be said that large scale acute oil spills from sea traffic can affect considerable sea and coast areas, many natural resources could be damaged and the damage potential will be substantial high. The probability that such accidents can occur is current low.

Figure 5.12 The coastguard in Norway is an important element in the national oil spill prevention and combat.

5.2.3 Norwegian-Russian bilateral agreement on oil spill prevention and response

In April 1994, Russia and Norway signed an agreement that adopted the "Joint Contingency Plan for the Combatment of Oil Pollution in the Barents Sea". The joint plan provided regulations for cooperation between the competent authorities of the two countries on oil spill combatment, exercises and regular meetings. Here we publish some extracts from the agreement.

The Joint Contingency Plan provides for coordinated and combined responses to oil pollution incidents in the Barents Sea. The joint plan shall be implemented subject to the provisions of the Agreement. The plan primarily addresses international matters and is meant to support relevant national, state, republic, regional, and sub regional (local) oil spill prevention and response plans of the countries.

The objectives of the joint plan are:

a. To develop appropriate preparedness measures and systems for discovering and reporting the existence of a pollution incident within the areas of responsibility of each Party.
b. To provide the means to institute prompt measures to restrict the further spread of oil.
c. To provide the mechanism by which adequate resources may be employed to respond to an oil pollution incident.

The implementation of the joint plan is the joint responsibility of the Norwegian Coastal Administration (NCA) and the Marine Pollution Control and Salvage Administration (SMPCSRA) under the Department of Maritime Transport of the Russian Ministry of Transport. The two agencies are the competent authorities, they shall be assisted by other national agencies as appropriate and when required.

The joint policy pursuant to the plan is based on three fundamental aspects: planning, coordination of joint response and communications. The main principles and procedures for implementing the joint plan are as follows:

- The competent authorities of Norway and Russia will cooperate as fully as possible to respond expeditiously to an oil pollution incident that affects or threatens to affect both countries. Actions taken pursuant to the joint plan shall be consistent with the legal authorities, operational requirements and other obligations of each of the operating authorities.
- Any oil pollution incident that presents a potential threat to a country shall be reported promptly to the appropriate agency of that country in accordance with the provisions of this plan.
- In a response situation that falls within the scope of this plan, the Norwegian Coastal Administration and responsible authorities in Russia will make available any resources they may have which could be used for joint response operations, subject to the availability of those resources.
- The existing national decision-making process of each country will be followed to determine whether dispersants or other chemicals will be used to respond to a oil pollution incident. The use of dispersants or other chemicals in situations which can affect the interests of both countries shall only be undertaken upon agreement.
- The plan may be invoked when the Norwegian or the Russian side asks for

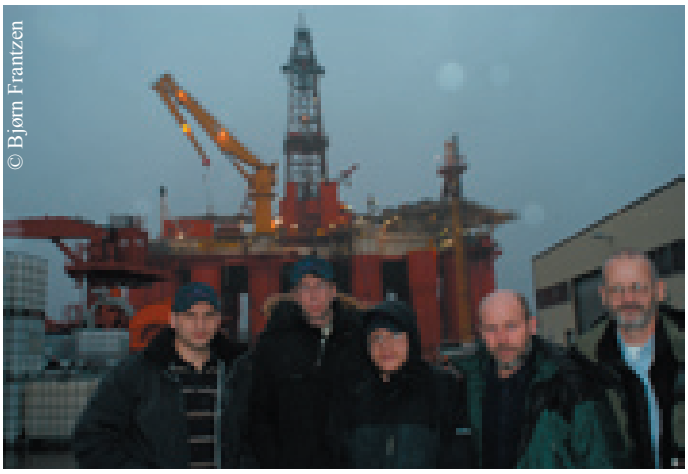


Figure 5.13 The Specialised Marine Inspection chairmen from the regions of Nenets, Murmansk and Arkhangelsk during a visit to the CCB base outside Bergen in November 2004. The inspectors are administrated by the Federal Service for Environmental Pollution Control (Rosprirodnadzor) of the Russian Ministry of Nature Resources. The visit was a part of the Norwegian Pollution Control Authorities unit capacity building project.

assistance according to the Pollution Reporting System (POLREP) in the event of an oil pollution incident which originated within the area of responsibility of one country, and which is accompanied by a threat of oil spreading into the area of responsibility of the other country, or where such spreading has already occurred.

- The plan may also be invoked by agreement between the Norwegian or the Russian side in the event of a pollution incident where no oil has spread or threatened to spread into both areas of responsibility but where the magnitude of the incident, or other factors, makes a joint response desirable.
- The plan may also be invoked by agreement when the Norwegian or the Russian side, in the event of an oil pollution incident originating outside the areas of responsibility of both countries, results in a threat of oil spreading into the area of responsibility of one or both countries.

The joint plan is up-dated every half a year. And the joint meetings and exercises are held every second year alternating between the countries.

The POLREP is established between two countries. POLREP shall contain all relevant information of the nature of extent of the accident or pollution likely to constitute a serious threat to the coast or related interests of Norway and Russia.

5.2.4 Early warning – the need for advanced notification of hazardous cargoes

In 2003, the Norwegian Ministry of Fisheries and Coastal Affairs initiated a cooperation with the Russian Ministry of Transport on the development of a joint notification and information system, for enhanced monitoring of the ship traffic in the Barents and North Seas. Norway and Russia intend to establish Barents Vessel Traffic and Information System (VTMIS). Barents VTMIS will in part be based on the exchange of Automatic Identification System (AIS) data between the authorities of the two countries, with the traffic control centres in Vardø and Murmansk playing central roles.

Throughout the year of 2004, Norwegian authorities have steadily improved the dialogue with the tank vessels engaged in international traffic in the Russian Barents Region. The vast majority of these vessels now volunteer information demanded by the authorities. From 2004 onwards, AIS will be installed in all tank vessels, making it possible for Norwegian authorities to track them after they are set in motion (and not before). The AIS signals also provide information on the cargoes carried on board.

In order to organise its preparedness and response

Figure 5.14 The Joint Norwegian-Russian Environmental Commission meeting in Syktyvkar, Komi 2003.

resources in the best possible manner, Norwegian Coastal Administration wishes to receive notification of hazardous cargoes two days before the vessels enter the Norwegian Economic Zone.

5.3 ENVIRONMENTAL PROBLEMS

By describing several incidents that have occurred during the transportation of petroleum in Norway and Russia in 2004 as well as in the latter part of 2003, we aim to highlight the possible environmental effects of such transports. The report focuses mainly on the Russian part of the Barents Region. Seen in a European perspective, the volumes of oil transported by sea in the region are not significant yet. Nevertheless, in the next ten years, this situation is likely to change considerably. Statistically, accidents rarely occur during the transportation of oil. However, since the total volume of oil transported by sea worldwide is formidable, accidents still occur all over the world. And when they do happen, the effects are often wide-ranging, both to the environment and to the human beings that are dependent on the areas impacted. The transportation of oil in Arctic waters may present challenges that are greater and of a different nature than in warmer climates. This is due partly to the fact that the sea areas are covered by ice parts of the year, which is a challenge to the recovery of oil spills, and partly because the slow dissolving oil in cold temperatures is an additional threat to the environment.

Against this background, and to illustrate that accidents happen all the time, we have chosen to give a description of incidents in all of the territories that affect Norway and Russia.

To do this, we focus an oil spill caused by a collision in 2003 between two tankers in the Onega Bay in the White Sea. Then we record news reports on oil spills found in Russian media. Lastly, we focus in more detail on two ship accidents, namely the *Cristoforo Colombo* accident at Sakhalin in Russia in September 2004, and the *Rocknes* accident in the vicinity of Bergen in Norway, the latter being the most costly environmental operation in the shipping industry in Norway up to this date.

5.3.1 Oil spills in the Barents Region

Oil spills occur all the time and everywhere - in Russia, in Norway - and in the rest of the world. It is important to focus on the fact that oil spills happen during transportation, and to motivate the industry to reduce the oil spills as far as possible. Below, we have compiled a list of spills that have occurred in Russia through the last few years. The description is based on information collected from Russian newspapers, journals, radio and TV. Our intention has not been to list every the oil spill in Russian Barents, but to provide information on the ones that we have found by chance. We have also included information from two clippings in order to give a picture of the dimensions of the pollution involved: one on a statement by the chairman of the State Duma Committee on Ecology about oil pollution to the sea, and one on oil spills in the Khanty-Mansisk Region, a region in Western Siberia most important to the Russian oil production.

2003. The Republic of Komi

In 2003, the industry in the Republic of Komi paid a total of 6 million RUR in environmental compensation for accidents and pollution, according to the Komi Ministry of Nature Resources. This sum is only symbolic, considering the amount of pollution, since the total damage to the nature has a price far exceeding 200 million RUR. The Minister has said that in 2003, there were 24 emergency situations within the oil production and oil processing industry, several of which led to the pollution of waters. The most serious case was in the village of Usogorsk, where 800 tons of oil ran into the river Usa. All these cases show that the environmental situation within the oil production and the oil pipelines remains precarious.

2003. Sea waters. The Russian Federation

Vladimir Gratchev, Head of the State Duma Committee on Ecology, has stated that development of any industrial complex in Russia, including the petroleum industry, should be based on upholding the ecological safety norms and, as far as possible, the environmental protection. “Our competitors, I mean the West, tries to accuse that we have problems with ecology, and the petroleum industry threat the marine biology in the northern seas; they produce nice booklets. But at the same time the Russian extraction is absolutely harmless. There are 2500 cubic kilometres of water in the northern seas. That is a huge amount of water. And the petroleum industry discharge 779 000 tons into

water areas. It looks like a great number, but this is only one of two-milliard part of the total volume. Thus, the fish will not change the habitat due to hydrocarbons extraction in the Arctic seas", - said Gratchev during the conference "Prospects of hydrocarbon resources development in the North-West of Russia" held in Arkhangelsk in February 2004.

January, 2004. Severnaya Dvina River, Arkhangelsk Region

According to the Arkhangelsk Regional Department for Emergency Situations, fuel oil leaked from reloading facilities in a military base in Gluhoy village, and polluted ice covered Severnaya Dvina River. The Department ran investigations, and evaluated that about 1100 tons of fuel oil leaked from the base. According to the Head of the Department, an increasing number of oil spills are not being reported to the authorities. He has called for a restructuring of the reporting system, in order to prevent information from being withheld, since it is unacceptable that the authorities are informed about emergencies only through the media.

The Cleaning operation in Severnaya Dvina started in January and continued all through February. In March 2004, the Department for Emergency Situations reported that local people discovered oil spots in the Severnaya Dvina River. Oil pollution occurred when the snow started to melt. According to the Head of the Department, this was a result of earlier oil spills. The ones that were discovered were emergency oil spills from the military base in January, and oil products spill from the petroleum storage depot in Talagi in February 2004 (Dvinainform.ru/BarentsObserver.com/Arnews.ru).

Figure 5.15 The British tanker *Themsestern* during loading of oil at Rosneft-Arkangelsknefteprodukt Talagi oil terminal. On December 20th 2004 this tanker collided with the pier in the Arkhangelsk Ekonomia port. It was loaded with 22 000 tons oil on her way out of Talagi terminal. In 2004 about 3.4 million tons were exported from Talagi.

April, 2004. Teriberka, Murmansk Region

According to the Department of Emergency Situations, 1000-2000 tons of fuel oil was spilled into the Lodeynoe Bay in Teriberka. The spill occurred during fuel loading from the tanker *Dnepr* (5100 tons deadweight) to local land oil storage tanks in a ship repairing workshop (Regions.ru).

May, 2004. Kola Bay, Murmansk Region

The aircraft carrier *Admiral Kuznetsov*, at the time stationed at a military ship repair base in the Kola Bay, leaked an unknown amount of oil into the surrounding waters. Representatives from the Arctic Specialized Marine Inspection requested access to the ship, but did not get permission from the Northern Fleet management. The inspectors said that *Admiral Kuznetsov* had leaked oil several times, and that it just recently had been fined for another spill (Regions.ru).

May, 2004 Khorey-Ver Village, Nenets Autonomous Area, Russia

Experts learned about a rupture in an oil pipeline in the Nenets Autonomous Region only two months after it occurred. According to the Administration of the region, the incident took place at the Musyurshor-Sandivei 150-mm oil pipeline, owned by the Severnoye Siyanie (Northern Lights) company. A Nenets reindeer-breeder informed about the emergency. A special commission confirmed the information about the oil leakage at the pipeline section in the area of the Khorey-Ver village (215 kilometres from Naryan-Mar), through which the company pumps oil from Musyurshor oil field. The pipeline rests on a wooden construction. It is the only one of its kind in Nenets Region, and one of the few remaining in Russia.

The leadership of Severnoye Siyanie concealed the facts of the incident from executive authorities and control structures of the region, and continued to pump oil. According to one of the versions of the incident, the oil pipeline could have been damaged by heavy machinery, as the oil spill place is situated near a local winter road. A rupture had already taken place at the same oil pipeline in the summer of 2003, when about 150 tons of oil polluted Sandivei and Kolva Rivers. The oil slick then

reached the Republic of Komi. The incident inflicted environmental damage of over 19 million roubles (Itar-Tass.com/Arnews.ru/Interfax.ru/Bellona.no).

June, 2004. Kolguev Island, the Nenets Autonomous Region

During the reloading of oil from a tanker to land based storage containers at Kolguev Island, unknown amounts of diesel oil ran into the sea. Strong winds broke off transmission pipes and led the oil to the beaches. The tanker contained 50 000 tons of fuel. "This year's flatfish catch is bad, said one local inhabitant. – Therefore we eat the fish we get, although it smells badly of the oil" (BarentsObserver.com/Business Class).

August, 2004 Murmansk city, Murmansk Region

A man who was out picking berries detected an oil spill 23 km from the city of Murmansk. The spill covered an area of approximately 3000 square metres. The source of the oil pollution was a discharge of 120 barrels (0.2 cubic metres each) of waste oil. The barrels filled with waste oil were placed in a restricted area for waste oil disposal. Until the spring of 2004 this area was used by Arktikmorneftegazrazvedka. The reason for the oil spill was the activities of scrap metal collectors, who tried to cut up the barrels of waste oil. Arctic-Eco, the owner of the restricted area, now has to restore the area (Regions.ru).

September, 2004. Amderma, Nenets Autonomous Region

The Russian tanker *Nefterudovoz-42M*, loaded with more than 2500 tons of diesel oil, grounded in the Kara Sea outside the settlement of Amderma. Emergency personnel managed to pull the vessel back into open waters in a week. Officials reported that no oil had leaked from the ship (Dvinainform.ru/BarentsObserver.com).

October, 2004. Kola Bay, Murmansk Region

On October 23rd, the bulk carrier ship *Stepan Razin* (19 500 tons deadweight; built in 1980) from Murmansk Shipping Company was wrenched free from anchor by strong winds, and was thrown onto rocks at the mouth of the Kola Bay where it eventually sank. It was heading for Finland, carrying 18 000 tons apatite concentrate, with 287 tons of fuel in the tanks.

According to the Department of Emergency Situations of the Murmansk Region, the ship sank because of the severe storm, with wind forces of 5-6. The ship was anchored, awaiting improved weather. It was wrenched free from the anchor and thrown onto the rocks in the area of the Cape of Bolshoe Lodeynoe, and as a result of this, the ship got a split in the hull near the engine room.

The rescue operation started immediately after the alert about the disaster was sent to the traffic control centre. Helicopters carried out the rescue operation. One Ka-27 from the regional Rescue base of the Aviation Safety Committee picked up 18 crewmembers, and a second helicopter evacuated five more sailors. "As the weather improves, the divers will examine the ship for damage to make a decision about the salvage action," said the regional Department of Emergency Situations. The Department stated that it believed that no major harm was done to the environment. "The engine-room, where the main damage occurred, is located rather far from the holds with apatite concentrate, and for this reason the cargo must be intact," it said.

On October 27th, media reported that fuel from the wrecked bulk carrier *Stepan Razin* covered a large part of the Kola Bay. The Murmansk Basin Emergency and Salvage Department (MBESD) had the main responsibility for the clean-up, and environmental organisations observed with great interest how the local authorities dealt with the operation.

On November 3rd, 60 tons of diesel fuel were pumped into the ice breaker *Vladimir Ignatyuk* from the fuel tanks of the bulk carrier *Stepan Razin*. According to information from the regional Department of Emergency Situations, 200 tons of fuel oil still remained in the tanks of the ship at the time. The remaining fuel was to be pumped out of the sunken ship to the tanker *Don* in the nearest future. The oil spill response unit installed oil protection booms around *Stepan Razin* to prevent oil from spreading out, in case of leakage to the Kola Bay. Two boom-setting ships, *Markab* and *UMOB-20F*, as well as the tug *Taymyr* and the salvage ship *Mikula* kept watch near *Stepan Razin*. At that time, there was no leakage of oil from the ship, the Department informed. Salvage operations were then suspended because of bad weather conditions. Murmansk Shipping Company and the Department of Emergency Situations then started preparing the

Figure 5.16 October 23rd 2004 the ship *Stepan Razin* owned by Murmansk Shipping Company was wrenched free from the anchors by strong wind and thrown onto the rocks at the mouth of the Kola Bay where she sank (see Fig. 5.17).

operation to pull the ship off (Rian.ru/Regnum.ru/ BarentsObserver.com/Bellona.no).

November, 2004. Pechora River, the Republic of Komi

Four river tankers, with about 2000 cubic metres of oil products on board, froze into the ice in the Pechora River near Seliayur in the Izhemsk District. The tankers were owned by the Pechora Shipping Company and a private businessman. The shipowners received an order to offload the oil products from the tankers (Regions.ru).

December, 2004. Murmansk City, Murmansk Region

Due to the cold weather in Murmansk in December, equipment for the reloading of oil broke down. These technical problems aggravated the difficult situation for the unloading of oil from railway tank cars in the region. More than 1500 railway cars loaded with oil and coal were waiting for unloading before the Murmansk port at the time. According to the regional railway company, the port experienced serious capacity overload, and oil deliveries to the port of Murmansk were suspended for one week (Regnum.ru/Logistic.ru).

December, 2004. Arkhangelsk City, the Arkhangelsk Region

The British-owned oil tanker *Themsestern* (22 000 tons deadweight; built in 2000) collided with the pier in the Arkhangelsk Ekonomia port. The vessel, which was loaded with 22 000 tons of oil, was on its way out of the oil reloading terminal in Talagi, Arkhangelsk when a dysfunction of the ship's steering mechanism put the ship on collision course with the pier. No major damage was made to the ship. The nearby Krasnaya Kuznitsa shipyard repaired the damaged front part of *Themsestern* (BarentsObserver.com/Arkheco.ru).

2003 and 2004. Khanty-Mansiysk, Russia

About 2000 oil spills were registered in the Khanty-Mansiysk Autonomous Region in 2003. The regional authorities have stated that about 1000 tons of spilled oil reached the watercourses in the region that year. In

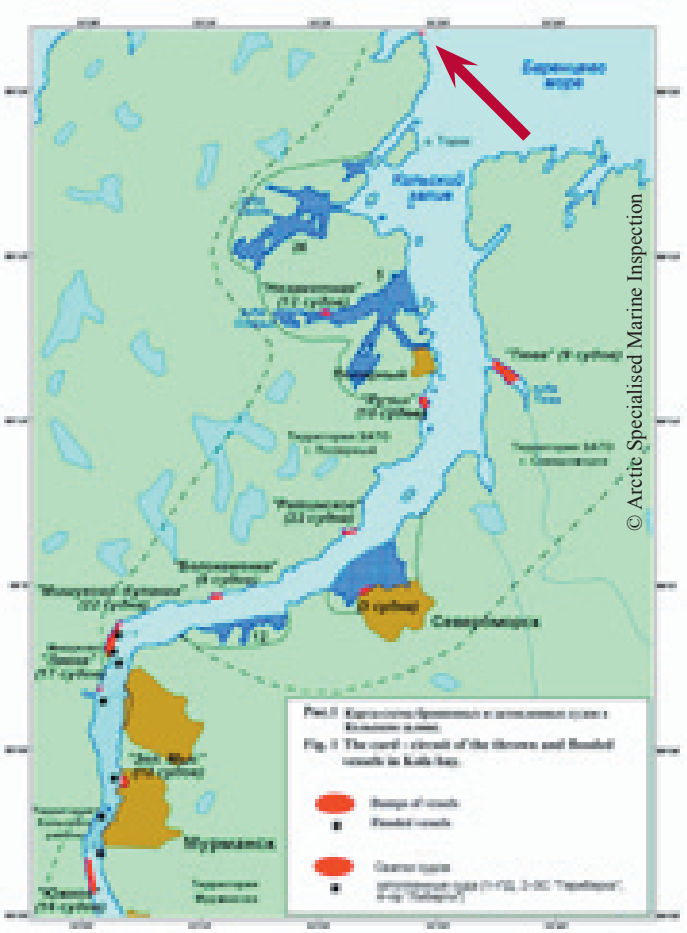


Figure 5.17 Dumped and flooded vessels in the Kola Bay. The red arrow points to the place where *Stepan Razin* sank.

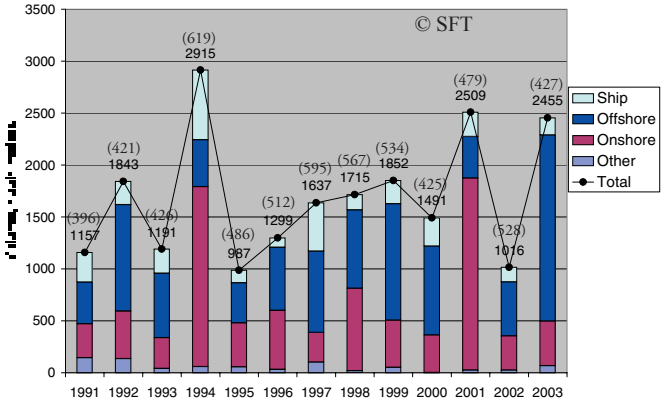


Figure 5.18 Petroleum spills in Norway 1991-2003. The numbers in the parenthesis above the columns give the number of oil spills.

2004, the amount of oil spills was about 2800.

A total of 177 accidents occurred in the fields operated by Yuganskneftegaz, the former Yukos main producer, during these years. According to head of the Surgut district environmental department, this is the highest accident rate ever recorded. In the whole Surgut district region, 251 accidents were registered in 2004, which is nearly double the number of accidents in 2003. The largest man-made accidents happened in the old oil fields in the Nizhnevartovsk, Nefteyugansk and Surgut districts. According to environmentalists, accidents are caused by

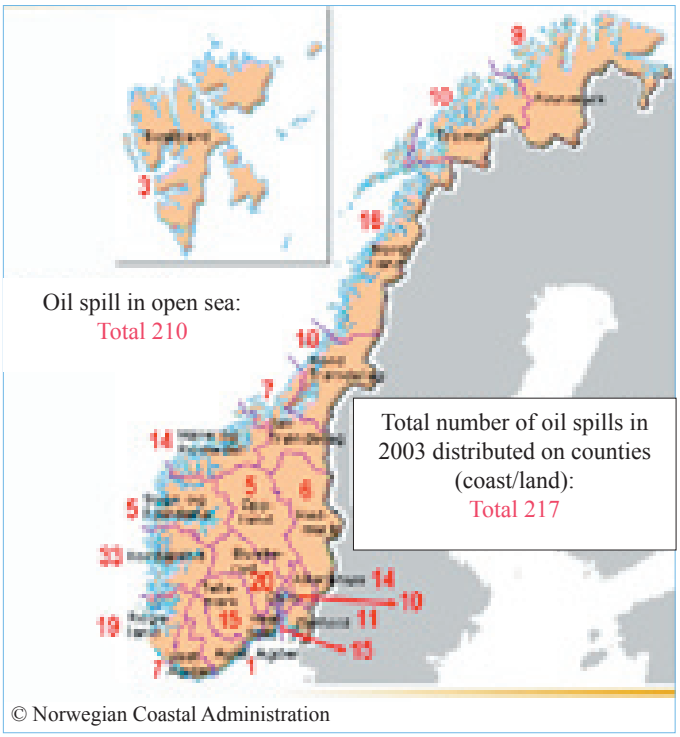


Figure 5.19 Total number of oil spills in 2003 distributed on the counties.

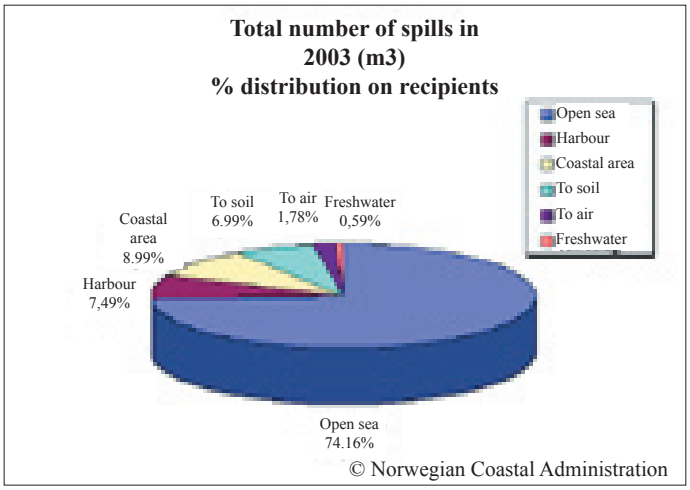


Figure 5.20 Total amount of oil spills in 2003 (m^3) in Norway distributed on recipents.

long-term lack of maintenance on the pipelines. More than 10 hectares of land were polluted by leaks from oil pipelines, and about 340 tons of oil spilled into water and land (Itar-Tass/Forest.ru/BBC Monitoring International Reports).

Oil spills in Norway

The Norwegian national oil spill statistics for the period 1991-2003 are made by the Norwegian Pollution Control Authorities (fig. 5.18), with detailed information from 2003 (fig. 5.19 and 5.20).

5.3.2 Oil Spill in The Onega Bay

New terminals for the export of oil from the Russian part of the Barents Region to the markets in Europe have emerged every so often during the last three years. At some of these terminals, safety standards have been acceptable. From early on, the operation at one terminal, the transshipment in the Onega Bay in the White Sea, stood out as a high-risk venture. Several critical voices were heard during the preparations for the approval of the oil transshipment terminal in the Onega Bay, but for the municipality, the project was also regarded as a new possibility for the speedy recovery of the local economy. However, things went wrong in the Onega Bay after only two months of operations. A river-sea tanker with a cargo of fuel oil ran into the terminal ship, which was to receive the cargo, and oil spilled out into the sea. Seen out of context, this was not a serious matter, but the case was considered to be a matter of great principle interest on the Russian side. After the collision, the Volgotanker Company, an

owner of the terminal, did not notify of the accident, and it was only made public after local inhabitants had raised the issue. The community of Onega has scarcely received any compensation from the Volgotanker Company for the use of the sea areas in its near vicinity for the transshipment of oil. The local population was very indignant and angry. The Volgotanker Company was brought to court, lost, and has to pay damages. The shipment of oil from Onega will, however, resume in some way or other in the future. By way of giving this detailed insight into the case of the transshipment of oil and the incident in the Onega Bay, we wish to draw attention to the fact that this is the first accident under the new export-boom. There may be something to learn from what has happened.

In 2003, the Volgotanker Company initiated the project "The White Sea". This project focused on the transportation of fuel oil through the White Sea-Baltic canal by tankers of the "river-sea" class of *Nefterudovoz* type, with subsequent transshipment into sea tankers such as *Zoja-I* and *Zoja-II* from the Latvian Shipping Company. Transshipment of the oil was organised offshore, near the Osinki Islands in Onega Bay. The plan was to transport 800 000 tons of oil products during the 2003 summer navigation period, and to increase the volume to 1.5 million tons in 2004.

The transshipment of fuel oil at the anchorage in the Onega Bay began on June 24th 2003, when the tankers *Nefterudovoz-24* and *Nefterudovoz-38* each transferred 2700 tons of fuel oil to the sea tanker *Zoja-I*.

On September 4th 2003, the mass media reported that on September 1st, an oil spill had taken place near the Osinki Islands in the Onega Bay. Some 50 tons of fuel oil had poured out into the sea. On the same day, the inspector from the Committee on Environment Protection of the Onega District informed that the oil spill had taken place at the mooring line of the anchorage. During loading, the vessel *Nefterudovoz-57M* had got a crack in its left side, and about 0.5 tons of fuel oil leaked out. However, crew members from the vessel had already collected the oil from the water surface.

On September 5th, the press-office of the Administration of the Arkhangelsk Region informed that about 400 kilograms of oil products had leaked into the sea. According to the information provided by the Department of Civil Defence and Emergency Situations of the Arkhangelsk Region, on that day there were no oil slicks on the surface of the White Sea, and the situation was normal. The investigation was going on.

Figure 5.21 Reloading operations close to the Osinki Islands in the Onega Bay started in June 24th 2003 and were terminated after a collision between *Zoja-I* and *Nefterudovoz-57M* happened on September 1st 2003.

On the same day, the Northern Shipping Company, according to the order of the Ministry of Transport of the Russian Federation, sent the salvage launch *Metel* to the area of the oil spill for data collection. The launch *Metel* found a polluted zone of 8 square miles (about 27 km^2) near the Osinki Islands. The contamination consisted of separate pieces of oil-water aggregations floating in the sea. Some of these aggregations had sunk already, and had formed sediments. The crew had also caught a duck completely soiled with fuel oil. The material was delivered to the authorities and the press. Video records were also made, and the video information was shown by local TV Company "Pomorie".

On September 8th, data was published showing that during the incident that had taken place on September 1st, about 100-150 kilograms of fuel oil had leaked into the sea. According to a statement made by the Onega port, a contact (leaning) of the ship *Nefterudovoz-57M* with the tanker *Zoja-I* had taken place on September 1st, on the external roadstead of the Onega port during the mooring. An examination of the ships, conducted by the captain of the Onega port together with a special commission, concluded that there had been an operation incident during the mooring. The tanker *Zoja-I* had no damage, but *Nefterudovoz-57M* had a dent the size of1.5 metres x 1.5 metres and an insignificant crack in the hull. When the technical examination was completed, *Nefterudovoz-57M* continued its voyage.

On September 9th, the Department of Nature Resources and Environment Protection of MNR RF

for the Arkhangelsk Region reported that, according to the information provided by the Volgotanker Company after the oil spill had taken place in the Onega Bay, 370 tons of water polluted with fuel oil had been collected, and about 350-500 kilograms of oil products still remained in the sea. This shows that officials in the public corporation Volgotanker Company had concealed the facts of the incident, which caused the differences in the information that had appeared in the mass media in the Arkhangelsk Region.

On September 15th, information was published that collection of fuel oil continued on the coast of the Onega Bay, on the territory of the planned National Park Onezhskoye Pomorie. The collection of fuel oil was paid for by the Volgotanker Company (at first 250 RUR, and later 400 RUR per day). The oil was collected in sacks and then burnt. The chairman of the 40 years of October fishing collective farm reported that 40 kilometres of the coastal line were polluted. A lot of dead ducks, seals, and fish were found. The coast near the Purnema village was most heavily polluted. On the average, 10-12 ducks per kilometre in the polluted area were soiled by fuel oil, but an accurate estimate of the damage was not possible.

On September 15th, the Head of the Administration of the Arkhangelsk Region issued an order, recommending the Department of Nature Resources and Environment Protection for the Arkhangelsk Region to suspend the Volgotanker Company's operation of transhipping of oil in the Onega Bay of the White Sea.

On September 16th, on the decision of the Department of Nature Resources and Environment Protection for the Arkhangelsk Region, the operation of the Volgo-tanker Company in the Onega Bay was suspended until the completion of an investigation into the causes and effects of the pollution from the company's operation.

On September 18th, the research vessel *Poisk* of the Northern Polar Research Institute of Fisheries (SevPINRO) arrived in the Onega Bay, to examine the sea water, flora and fauna. The task of the expedition was to collect samples of fish and bottom invertebrates and vegetation, and to estimate the White Sea herring stock.

On September 19th, the leader of the Onega District Hunting Inspection claimed that more than 300 birds perished due to the oil spill in the Onega Bay.

On September 23rd, the Volgotanker Company was permitted to continue the fuel oil transshipment in the Onega Bay. The permission was given by the Department of Nature Resources and Environment Protection of MNR RF for the Arkhangelsk Region, on the condition that Volgotanker Company prepared and presented a "List of measures for the improvement of the interaction in respect of the prevention and management of emergency situations in the area of the Onega transhipping complex". Measures for management of the consequences of contamination and monitoring of possible secondary contaminations also had to be carried out.

By September 12th, 12 000 war- and labour veterans from the Onega District and 1500 inhabitants of Onega town had signed an application from a group of initiators for the investigation into the circumstances of the oil spill in the Onega Bay. In particular, they asked the Public Prosecutor to inspect and, in case of confirmation of data published in the newspaper "Onega", to call for a court order for the suspension of the activity of the Volgotanker Company until measures were taken to prove full compliance with the nature protection requirements (the full text of the application is stated below).

The application was prepared on the basis of material published in the mass media of the Arkhangelsk Region, and delivered to the Office of the Public Prosecutor of Onega town and the Onega District. It was then passed to the Office of the Public Prosecutor on Transportation in the Arkhangelsk Region. The leader of the group of initiators reported that the public of the Onega District was indignant at the lack of information and that, according to informal data sources, despite the ban from the regional administration, the transfer of oil products in Onega Bay continued in a new place.

As one of the results of the active stance of the mass media and the inhabitants of the Onega District, a statement made by Volgotanker Company was published in the press on October 7th. It stated that about 0.15 tons of fuel oil had leaked into the sea, but had been picked up by personnel and resources of Volgotanker Company within three hours after the incident (the full text of the statement is below).

On October 9th, a message was published that the Arkhangelsk Specialised Marine Inspection of MNR RF had estimated the damage from the fuel oil spill at 4 896 000 RUR. The papers on the damage were

delivered to the Office of the Public Prosecutor on Transportation in the Arkhangelsk Region. The managing office of the state fishing inspection Sevrybvod, on their part, had not estimated the damage, but would also raise a claim. At the same time, Volgotanker Company hired personnel at 700 RUR per day to incinerate dead birds on the coast of the White Sea.

On October 31st, the Arkhangelsk Specialised Marine Inspection completed its investigation into the circumstances of the oil pollution. The conclusion was that as a result of the accident on September 1st, 23.2 tons of fuel oil M-100 spilled out into the Onega Bay. The oil reached a coastal zone and was spread out along the shoreline. The damage to the environment from the pollution was estimated at 6 391 600 RUR (the conclusion of the investigation is stated below).

The Office of the Public Prosecutor brought a criminal case against the captain of the vessel *Nefterudovoz-57M*, claiming criminal liability for the violation of the safety regulations for sea transportation. However, the case was closed, as amendments to the Criminal Code came into effect on December 8th 2003, removing the criminal liability for the action performed by the captain. The Office of the Public Prosecutor also considered the action performed by the captain of the Onega port, but reached the conclusion that no regulations were violated, as there was no provision in his instructions to report accidents to the sea inspection.

On December 24th, information on the consequences of the fuel oil spill from the tanker *Nefterudovoz 57M* in the Onega Bay was reported at the meeting of the coordinating board on environment protection at the Administration of the Arkhangelsk Region. According to the Head of Sevrybvod, 74 kilometres of the shoreline of the White Sea was polluted as a result of the accident. The representative of the Volgotanker Company declared that about 100 tons of oil were collected in September-October and burned, but did not give any information on the total volume of the oil spill, as he stated that this should be estimated by the Office of the Public Prosecutor. He also confirmed that the Volgotanker Company would pay all damages from the oil spill in the Onega Bay, but not until after the completion of the investigation by the Office of Public Prosecutor.

On December 26th, the Arkhangelsk Specialised Marine Inspection presented the Volgotanker Company with a claim for 12 397 500 RUR in the Arbitration Court of the Arkhangelsk Region. The Office of Public Prosecutor on Transport of the Arkhangelsk Region stated that the sum should be used for environment protection, and also to the benefit of the local people in the coastal area. According to calculations by experts, 45 tons of fuel oil leaked out to the sea. Experts also established that when the crew started measures to prevent the spill, the main amount of the fuel oil had already drifted 1750 metres away from the site of the accident.

On February 11th 2004, the preliminary hearing in the case of the Arkhangelsk Marine Specialised Inspection versus the Volgotanker Company was scheduled in the Arbitration Court of the Arkhangelsk Region, but the hearing was postponed due to a petition by Volgotanker Company.

The damage from the oil spill in the Onega Bay was estimated by the claimant, at 14 847 000 RUR. The total amount increased after the Arkhangelsk State Technical University, at the initiative of the Office of the Public Prosecutor on Transportation, had carried out a renewed estimate of the damage. According to the expert opinion, 45 tons of the fuel oil M-100 that leaked out into the sea were not collected. Some 9 tons of the fuel oil had been collected from the water surface. Thus, about 54 tons of fuel oil had leaked out into the sea.

On March 4th, the hearing of the arbitration case concerning the claim of the Arkhangelsk Specialised Marine Inspection on Volgotanker Company was held in Arkhangelsk. Attending the proceedings were representatives from the Arkhangelsk Specialised Marine Inspection, representatives from the law firm YurInflot, representing the interests of Volgotanker Company, and also experts from the Department of Nature Resources and Environment Protection for the Arkhangelsk Region, the Northern Polar Research Institute of Fisheries, and the captain of the vessel *Nefterudovoz-57M*. The representatives from the Volgotanker Company denied the claim. Firstly, they argued that the oil products collected in the Onega Bay were not identical to the oil transported by *Nefterudovoz-57M*. Secondly, they claimed that it was not possible to estimate precisely the total amount of the oil spilled into

the sea. In their opinion, the method of calculating the amount of fuel oil spills was not precise, with a margin of between 20 and 40 tons. They did not dispute the existence of the oil spill, but rejected the claim.

On March 29th, the Arbitration Court of the Arkhangelsk Region satisfied the claim against the Volgotanker Company for oil pollution, and the company was required to pay 12 397 500 RUR to the Onega District, as well as state fines of 73 587 RUR. The Volgotanker Company appealed the decision to the Arbitration Court of the Arkhangelsk Region.

In April, the captain of the vessel *Nefterudovoz-57M* left Volgotanker Company voluntarily.

In July, the Arbitration Court of the Arkhangelsk Region dismissed the Volgotanker Company's appeal against compensation for oil pollution to be paid to the Onega District. Volgotanker Company appealed the dismissal to the Arbitration Court of the North-West Federal Region.

On October 14th, the Arbitration Court of the North-West Federal Region dismissed the Volgotanker Company's second and last appeal.

According to the Department on Nature Resources and Environment Protection for the Arkhangelsk Region, the Volgotanker Company delivered neither oil nor oil products through the Onega Bay terminal in 2004. In order to transfer the oil through the Onega Bay, oil companies had to present a schedule of measures, which would be accepted in case of an emergency situation similar to the one of September 1st. However, Volgotanker Company decided that it was easier to deliver oil for export through other ports.

According to information provided by the Head of the Administration of the Onega District, the Volgotanker Company created 8 new jobs and transferred 12 500 RUR into the budget of the Onega District throughout its operation of the oil terminal in the Onega Bay. Taxes collected from the Onega Sea Commercial Port totalled about 300 000 RUR in 2003. And Volgotanker Company made no investments in the development of the society in the Onega District.

The appeal to the Public Prosecutor from the Onega people

Here we present the full text of the appeal to the Office of the Public Prosecutor prepared by the group of initiators on the investigation of the oil spill in the Onega Bay. The application was signed by 12 000 war and labour veterans of the Onega District and 1500 inhabitants of the Onega town.

An appeal to the Office of the Public Prosecutor from the people of Onega and the Onega district

The newspaper "Onega" dated September 6th 2003, printed an article on "Fuel oil stain will be estimated by the experts", describing facts that were reported on central and regional television. According to the article, the heart of the problem was that on September 2nd, an oil tanker sprang a leak 5 kilometres from the Osinki Islands near the oil terminal, and about 50 tons of fuel oil has run out into the sea. The author of the article, Anatoly Shapkin, has noted that we are not be able to discuss the scope of the catastrophe until it has been estimated by the experts. However, the following development of events bears the evidence that the officials tried to hide the real scale of the events from the community.

The same article declared that:

- A fuel oil spill was observed by fishermen, who passed on the information to Arkhangelsk. According to their observation, the information about oil spill had to come from the Trans-Volgotanker Company, which knew about the catastrophe as early as September 2nd.
- Acting chairman of the Committee on Environmental Protection, V.I.Dubinin, could not reach the place of the catastrophe. The Border Forces boat, which for reasons unknown was the only method of transport, did not go to the Onega Bay waters.
- Acting chairman V.I.Dubinin received only the explanations from the port's officials, who obviously belong to the interested party. They informed Mr. Dubinin that no major accident had happened.

In the newspaper "Onega", dated September 9th, the Deputy Chief of the Motor Licensing and Inspection Department and Emergency Measures (Arkhangelsk), Yury Chenchukov, reported that on September 5th, a fuel oil spill of 400 kilograms was eliminated. In the same newspaper ("Onega", September 9th), there is an interview with Petr Lukin, the representative of the Trans-Volgotanker Company, which is a part of the group Volgotanker. This paper states that:

- Local people have not got the new jobs that were promised;
- Budget supplies are limited by the port fees;

And, note that the best personnel of the company are involved, and Petr Lukin is absolutely sure that no drop of fuel oil is spilling into the waters of the White Sea.

In the same newspaper "Onega", dated September 9th, another article called "Fuel oil hits coast", informed the population about the results of the investigation conducted by the commission.

Figure 5.22 On the coast of the planned "Onezhskoye Pomorie National Park", 40 kilometre of coastline were polluted from the oil spill and approximately 300 sea ducks died from the oil spill.

On September 5th, no fuel oil spots were noticed during the air inspection. This is, however, to be expected, since the fuel oil at that time had been spreading for four days. Besides, representatives from the mass media and local authorities were not able to get on board the plane, except for the chairman of the Committee on Environmental Protection, V.V.Karpuhin, who tried to explain the absence of fuel oil on the water surface.

According to the article "Fuel oil hits coast", the management of the public corporation Volgotanker continued to reassure the people there had been no fuel oil spill at all, claiming that only a small amount of fuel oil had leaked out, and that all of it had been removed. This suppression of information of the incident was a gross error.

According to the Criminal Code of the Russian Federation, the refusal to provide information is considered to be a "Gross error".

Article 140. Refusal to provide information to the citizens.

The illegitimate refusal of an official to provide documents and material that directly affect the rights and freedom of the citizens, or the provision of incomplete or wittingly false information, on the condition that these acts have caused harm to the rights and valid interests of the citizens.

Article 237. Suppression of information on circumstances that represent a threat to public health or safety.

1. Suppression or distortion of information about events, facts or occurrences representing a threat to public health or safety or to the environment, performed by a person under the obligation to provide such information to the population and to agencies authorized to take measures to prevent the said threats.

The Arkhangelsk mass media has also confirmed the suppression of information.

A representative from the Volgotanker Company deliberately provided false information. The newspaper "Onega" on September 13th printed the article "The White Sea turned black", after the visit of a representative of the Onega mass media to the islands, and after having received phone calls from indignant people.

It has turned out that the fuel oil spill, on the coast only, was the size of about 30 kilometres, and for every 100 metres it was possible to collect not less than 100 kilograms of fuel oil. This proves that the initial information in the central mass media was correct. Manual collection of fuel oil was not organised until September 10, which means that the representatives of the Volgotanker Company, responsible for organizing the removal of the contamination of the sea environment were inactive for a period of 10 days, in which period they did nothing. This is considered as criminal negligence under article 293 of The Criminal Code of the Russian Federation

Due to negligence and suppression of information, the environment was severely damaged: a lot of fish and birds have perished and the natural equilibrium of the White Sea ecosystem is unsettled. The inhabitants of the coastal villages Lyamtsy and Purnema have also suffered property damages, as their main income is derived from the sea. It should be noted that very near the recreation zone is an area that was assigned to be country cottages of people living in Onega District and on the coast of the White Sea. This zone covers 35 kilometres. The people in the town as well as the people living on the coast have the right to receive timely and reliable information as to which plans are under way for projects that cause violation of the rights and valid interests of the citizens, namely, the right to a favourable environment.

The article "The White Sea turned black" (dated September 13th) recorded the facts of massive losses of fish and birds. The article was written after a visit to the islands, near the oil-tankers' anchorage, by a correspondent from the "Onega", Sergey Gorbunov, together with fisheries inspector Vitaly Suhanov, expert on environmental protection Viktor Dubinin, expert from the Department of Civil Defence and Emergency Situations Eugeny Buga, and chasseur Viktor Safonov. The fact is that the same newspaper printed information provided by the inter-district public prosecutor V.I. Frolov, who visited the islands on September 10th. His point of view was published later in the newspaper dated September 16th. The title of the article was "There is no major pollution of the environment", which speaks for itself.

The people of Onega fully disagree with this statement, and collect signatures to stop the transferral of oil and oil products in the Onega Bay. They are supported by the people of the Purnema village, who between September 10th and September 16th collected fuel oil on the coast, packed it into sacks and burnt it without protective means (article 247 of the Criminal Code of the Russian Federation), as well as the inhabitants of the coastal villages, for whom the sea is their main livelihood. In addition, the newspaper

"The Onega coast", dated September 19th, records the statement by the chairman of the 40 years of October fishing collective farm Leonid Kuznetsov, on the pollution of 40 kilometres of coastline and the mass loss of fish and birds. The greatest pollution was found on the coast near the village Purnema. Every kilometre along the coast, some 10-12 dead ducks were found. In the opinion of Vladimir Uroshnikov, Director General of the Northern Shipping Company, the Onega Bay has experienced an ecological catastrophe.

As for the people of Onega (23 000 inhabitants), they believe that the location of the oil-tankers in question was chosen without taking into account the short distance between the anchorage and the residence and recreation zones. The sea distance between the anchorage and the Onega settlement is 70 kilometres, of which 35 kilometres constitutes a recreation zone. No-one would conceive the idea of the transferral of oil in the sea area of health resorts like Yalta or Yurmala.

Article 246. Violation of the regulations on environmental protection during the execution of tasks.

Violation of the regulations on environmental protection during designing, allocation, construction, putting into operation and running of industrial, agricultural, scientific and other objects by the persons responsible for the observance of these regulations, if this has entailed essential change of a radiation environment, caused injury to people's health or mass loss of animal life or entailed other grave consequences.

Item 2 of article 34 of the Law of the Russian Federation "On environment protection" (from 10.01.02) contains provisions on the obligation of agencies of the executive power that manages environment protection to issue orders to suspend activities in case of a violation of the requirements in the field of environment protection.

The representative of the Volgotanker Company could not guarantee that a similar situation could not take place. In the article "Fuel oil on a coast", he promises only to draw a conclusion, but has not convinced the people of Onega that nothing like this would happen again. Besides, "the famous activity" of the above named company does not leave a place for such beliefs. Here are some data and examples:

Almost 4.5 million tons of mineral oil are being transferred on the Neva River, and the main part of the oil comes from the Yukos oil refineries in Samara. The average period of maintenance of the single-hull tankers that are used, such as *Volgoneft* and *Nefterudovoz* is more than 20 years. All their sea routes are polluted with oil. The Neva River and Ladoga, sole sources of water supply for the inhabitants of St-Petersburg receive the brunt of the pollution. However, it is virtually impossible to claim damages from the polluters. Thus, damages estimated at 200 000 USD, are still not claimed from the Volgotanker Company. The company is the owner of *Nefterudovoz-7*, which was responsible for the damage in October 1990, when 70 tons of fuel oil polluted the Neva River. By comparison, it can be mentioned that 12 million USD was paid in compensation to the city of Hamburg for the spill of 200 tons of Venezuelan oil in the Hamburg port. Also, the fact that the increase in the volume of oil transferred on the tank terminal in the Onega port is not accompanied by the development of means to manage oil spills is a reason for serious concern. The cost of such equipment can not be the problem, since the price of one metre of harbour boom is about 500 USD, and oil-gathering systems (skimmers) cost some tens of thousand USD. The main reason is the ability of the Russian oil companies to earn huge profits while at the same time complaining about the lack of resources to ensure at least a minimum standard of ecological safety in their activities.

In the small neighbouring country of Finland, all oil companies are obliged to pay fees at a rate of approximately 0.5 USD for each ton of oil to a special fund for the development of resources for the management of oil spills. This requirement applies not only to oil terminals, but also to any transportation of oil onshore and offshore in Finland. The sum is doubled if the tanker has no double bottom (double hull), i.e. its fuel tanks are not protected from the shock of grounding.

This provides a kind of financial insurance in case of oil accidents, and makes it unnecessary to compel the oil companies to have resources for the handling of oil spills, since the Government itself determines the needs for such equipment, and carries all responsibility for the removal of oil contamination. The Kaliningrad port has proposed the establishment of a similar fund. The estimated risk of contamination from the oil terminal will form the basis for the calculation of the fee. The better the terminal is equipped for handling oil spills, and the higher the level of preventive measures and accident elimination is, the smaller the fee its owner will be required to pay to the fund.

It would allow for the creation of effective mechanisms at a regional level for the response to oil spills, and at the same time make the oil companies lower the risks of contamination by taking preventive measures, taking into account the volume of transferred oil, the presence of sensitive ecological zones in the near vicinity (spawning grounds, bird nesting places etc.) and so on.

But Russia is different from Finland. And the maxim of the great leader still lives: "We shall go another way!" Such a fund is not established yet.

Figure 5.23 Citizens of Onega were chocked by the Volgotanker oil spill in September 2nd 2003 in the Onega Bay. They want more focus on environmental issues when oil will be exported through their region.

December 15th 1998, the General Office of the Public Prosecutor issued Order #90 "On the consideration of the applications and reception of visitors to the agencies of the Office of Public Prosecutor of the Russian Federation". Under item 3 of this order, these authorities should permit appeals by the citizens of the Russian Federation, foreign citizens and persons without citizenship, state officials and representatives of the state and private companies and organisations, and deputies that include information about cases of the violation of laws, rights and freedom of a person and a citizen. The authorities should check the information about such cases published by mass media.

According to item 6 of the Order #30, issued by the General Office of the Public Prosecutor May 22nd 1996, the agencies of the Office of the Public Prosecutor of the Russian Federation must arrange the inspection of the legislation violation cases according to the information they received (appeals from the citizens, state officials, information from mass media, and others). The inspections should be arranged, first of all, to secure state interests, and public rights.

The ambitious plans of Russian oil companies and the political elite of the country to multiply the increase of the oil export, and to escalate the oil production from the existing 320-350 million tons up to almost 510 million tons per year are alarming. These plans are being put into action on the background of closing down the government environmental authorities, ignoring universal experience and standards of safety, neglecting the responsibility for possible accidents, and absence of the legislative base for prevention of accidents and technical means for response to them.

On the basis of what has been mentioned above, we ask:

1. To carry out an inspection and in case of confirmation of the data published in the newspaper "Onega" to bring a criminal case.
2. To suspend the activity of the Volgotanker Company until measures for the compliance with environmental protection requirements are completed.
3. To ensure that material damages after the cleaning up are reimbursed
4. To take into account the District's interests.
5. To consider the problem of expediency of the activity of the Volgotanker Company.
6. To inform us in legal terms of the measures taken towards the Volgotanker Company.

The statement of Volgotanker Company

Below we present the text of the statement of Volgotanker Company that was published in the "Moryak Severa" newspaper in October 2003.

The statement of the Volgotanker Company concerning fuel oil spill in the Onega Bay

The mass media in the Arkhangelsk Region has published a number of articles that mislead readers and discredit the reputation of a shipping company.

On September 1st 2003, there was an incident in the Onega Bay involving the tanker *Nefterudovoz-57M*, which belongs to the shipping company Volgotanker. As a result of a crack in the ship's hull of length 8 cm, about 0.15 tons of fuel oil leaked out into the sea. By the use of personnel and resources from the Volgotanker Company, all the oil was collected within three hours after the incident. The whole operation was carried out in strict compliance with the standards for the removal of oil spills, which has been approved at the local and federal levels. Within the framework of environmental monitoring, extra measures for clearing the north-western coast of the Onega Bay of hydrocarbon pollutants, without regard to reasons and time of their origin, were organised by a specialised conservation agency. In official documents, various levels of local authority, autonomous bodies and independent public environmental organisations have confirmed the absence of any contamination.

Nevertheless, hysteria has prevailed in the local mass media, due to the attempts of influential commercial organisations with a doubtful reputation, which usurped state authority to take advantage of a situation and to gain control of the transshipment complex in the Onega Bay, which was established by Volgotanker Company on the instructions of the state authorities. These companies, by way of using dirty PR-techniques, stir up the public opinion in order to reach selfish ends. They bring false accusations, speculating on the inhabitants of the Arkhangelsk Region's love of nature. We emphasise that Volgotanker Company will always find legal ways to oppose all kinds of blackmail.

It is necessary to point out the absence of organised information exchange between the Volgotanker Company and the regional administration, which resulted in the blunt response by the Governor. The company expresses its assurance that the implementation of additional joint measures will provide for the efficient development of the Onega port. We aim to make a contribution that would help the Arkhangelsk Region become an important unit in the transport complex of Russia. Until today, Volgotanker Company has invested 15.5 million RUR into the development of the Onega port. We plan to increase these investments up to 54 millions RUR in 2004. New jobs have been created this year. Local community taxes paid by the Onega Sea Commercial Port have multiplied by 1.4, compared to the same period last year. The total sum paid by Volgotanker Company to the Onega port is more than 7.6 million RUR.

Safe transport process is the main part of the activity of Volgotanker Company. The shipping company is guided by the Russian and international standards of safety of navigation and is fully aware of its responsibility for the conservation of the natural resources in your unique region, and for the health and prosperity of the inhabitants.

Investigation by the Arkhangelsk Specialised Marine Inspection

Here we publish the text of the investigation report of the Arkhangelsk Specialised Marine Inspection.

The investigation of the accidental oil spill on September 1st 2003 at the oil storage tanker anchorage in the Onega Bay in the White Sea (documentation approved on October 30th 2003).

At about 14:00 hours on September 4th 2003, mass media reports and a telephone call from the captain of the Onega port simultaneously informed the Arkhangelsk Specialised Marine Inspection that an accidental oil spill had taken place at the anchorage of the oil storage tanker in the Onega Bay of the White Sea, at the anchorage transhipping complex "Osinki". The motor vessel *Nefterudovoz-57M* (ship owner: - Shipping Company Volgotanker), with 2 396 015 tons of fuel oil M-100 on board, leaned to the left shipboard (7th tank zone) while mooring to the motor vessel *Zoja*. As a result, the motor vessel *Nefterudovoz-57M* got a dent of the size 1.5 m x 1.5 m in her side, with a crack up to 100 mm at a distance of up to 1.5 metres below the watermark. There were 5 ruptures of the board hull up to 6 cm long and up to 2 cm wide in the middle of the dent. Pollution of the sea water occurred. In this case, weather conditions allowed offshore mooring according to operational standards. However, motor vessel *Nefterudovoz-57M* moored in darkness, and violated "The Guidelines for ensuring safe navigation, manoeuvring and anchorage of tankers by recommended sea routes to the offshore anchorage in the Onega Bay in the White Sea", approved by the captain of the Onega port on May 18th, 2003. Mooring was made to the motor vessel *Zoja-I*, which was anchored, and had no pilot on board. There was no towing arrangement in fair current and wind.

On the same day, September 4th 2003, the state inspector of the Arkhangelsk Specialised Marine Inspection came to Onega to learn the facts of the incident. According to the recordings in the logbook of the motor vessel *Nefterudovoz-57M*, the ship alarm sounded at 22:25 on September 1st 2003, when spots of fuel oil were noticed at the left side of the vessel, which was then moored to the base tanker of the motor vessel *Zoja-I* At 23:30, harbour booms are set out from *Nefterudovoz-57M*. At 23:35, a rope of harbour booms breaks. At 23:45, unloading of fuel oil by two pumps from 8 cargo tanks is commenced. On September 2nd 2003, at 00:30 the re-setting of harbour booms is completed. At 01:20, the setting up of the sea harbour boom "Anakonda" is started. At 01:50 the motor-launch *M3-150* completes the setting up of the second circuit of harbour boom, according to the plan "Elimination of oil spill". At 11:05 on September 2nd 2003, the unloading of fuel oil to the tanker *Zoja-I* is completed, and the preparation for the collection of fuel oil from the water surface with the skimmer begins. At 4: 10, the collection of fuel oil-water mixture into forward tanks #1 and #4 is completed. 347 614 kilograms of fuel oil was collected. The inspection of the motor vessel *Nefterudovoz-57M* was made impossible, since, on September 3rd 2003 at 16:00, the vessel had been given permission by the captain of the Onega port to leave the place of the incident and sail to the Belomorsk port. However, the inspector copied recordings made in the ship's logbook, an explanatory memorandum written by the captain of the ship, the damage report, the ship's technical report on the detection of damage, the application for permission for the ship to sail, and so on.

Ship owner does not contest the fact of water pollution. On September 5th 2003, the chief inspector, accompanied by the management of the Volgotanker Company, representatives from the mass media, and the Administration of the Onega town and Onega District, flew over the sea area of the Onega Bay to investigate the circumstances of the oil spill and to estimate the extent of the oil spill. Unfortunately, on that day, the air survey did not reveal the location of the oil spill. The transhipping operations were suspended until September 8th 2003. The ship's owner Volgotanker Company, was imposed a penalty of 200 minimum salaries for the omission to provide information on environmental pollution.

After having received information from various sources on oil contamination in the Onega Bay, the Arkhangelsk Specialised Marine Inspection, jointly with Northern State Sea Inspection of the Federal Security Service of Russia, decided to inspect the coasts of the Onega Bay and Osinki Islands to estimate the scope of the pollution. After the inspection September 10th-23rd 2003 it was established that in the area from Lyamtsa village to Purnema village, fuel oil had been washed ashore. The contamination was calculated to be 800 grams of fuel oil per running metre for a distance of 20 kilometres, making a total volume of 16 tons. On the coast near the Purnema village, samples of fuel oil were taken for the estimation of its surface content. Video records were made to secure material for evidence.

The management of the Volgotanker Company and the inhabitants of the villages had taken measures for the collection and utilisation of oil products. The islands Krestovaya Osinka and Potechnaya Osinka were also polluted with oil products. The chief of the Arkhangelsk Specialised Marine Inspection, accompanied by the chairman of the Committee on environmental protection of Onega and Onega district and a representative of the Volgotanker

Figure 5.24 Vladimir Markov, the head of Arkhangelsk Specialised Marine Inspections with the document of the Volgotanker operation in the Onega Bay.

Company inspected the islands. There, they found that fuel oil was spread out around the islands in a continuous belt, and above the tidal zone rocks and pebbles were covered with fuel oil. The distance of polluted coast on the islands was 7500 metres. The degree of contamination on the coastal line was 60%, the depth of contamination 1 metre, and the amount of the oil products washed ashore was 1.6 kg per square metres. The total amount of oil products spilled on the Osinki Islands amounts to 7.2 tons (calculated figure).

On October 2nd 2003, the Volgotanker Company was ordered to execute the clean-up of oil products from the coastal zone of the Osinki Islands in the Onega Bay in the White Sea. The order implementation is under control. A claim for the reimbursement of damages (total of 4 408 000 RUR) in the area of the Purnema and Lyamtsa villages was filed.

The Arkhangelsk Specialised Marine Inspection, when exercising its authority related to oil spills, interacts with the Office of the Public Prosecutor on Transport of the Arkhangelsk Region, the Office of the Public Prosecutor of the Onega District, the Department of Nature Resources and Environmental Protection MNR RF for the Arkhangelsk Region, the Head of the Administration of Onega town and Onega District, and other organisations.

The documentation "Anchorage for a storage tanker on its own anchor in the area of Onega town on the White Sea" was approved on June 4th 2003 by the Department of Nature Resources and Environmental Protection MNR RF for the Arkhangelsk Region. According to the conclusions of the expert commission, a fuel oil slick will drift to the coast depending on the direction of winds and currents. One part of the fuel oil will be washed ashore, while the other part will stay offshore. Nevertheless, fuel oil can move along the coast with the currents. A zone of coast contamination will spread if measures are not taken to collect the oil. Fuel oil M-100 is heavier than water and therefore it forms sediments as bituminisated aggregates (globules, agglomerates etc.). The Arkhangelsk Specialised Marine Inspection applies extra measures to verify the amount of fuel oil set on the sea bottom.

Calculation of payments for oil pollution in surface water (oil spill): According to Item 5 "Procedure for the definition of payment and limitations for environmental pollution, waste disposal, and other kinds of harmful effects", approved by the Russian Government Regulation of August 28th 1992 (with the edition of the Russian Government Regulation from June 14th 2001), and Russian Government Regulation from June 12th 2003 "On the standard payment for atmospheric emission of contaminants …", a standard payment for the discharge of 1 ton of a contaminant (oil and oil products – fuel oil) within established limits for emissions makes 27 550 RUR, the extra coefficient 2 being used for calculations. The payment for environment pollution beyond the established limits is defined by multiplying the appropriate payment for pollution within the limits, with the value of the excess of the actual mass of pollutant and then by multiplying these by 5. The damage to the environment caused by the Volgotanker Company, through the pollution of the coastline from Lyamtsa village to Purnema village of the Onega Bay makes:

16 tons x 27 550 RUR per ton x 2 x 5 x 1 = 4 408 000 RUR.

The damage to the environment caused by the Volgotanker Company, by the pollution of the coastline of the Osinki islands in the Onega Bay makes:

72 tons x 27550 RUR pet ton x 2 x 5 x 1 = 1 983 600 RUR.

As a result of the accident on September 1st 2003 with the motor vessel *Nefterudovoz-57M*, a spill of fuel oil M-100 occurred in the Onega Bay. The oil slick reached the coastline near Purnema and Lyamtsy villages, and the Osinki Islands, and was washed ashore. The amount of the fuel oil spilled out makes 23.2 tons. The damage to the environment is estimated at 6 391 600 RUR.

The claim of the total sum of 4 408 000 RUR was prepared and delivered to the ship owner, the shipping company Volgotanker. The claim for the remaining sum of 1 983 600 RUR is under preparation.

5.3.3 Two Ship Accidents in Norway and Russia

***Rocknes* disaster, Norway**

The *Rocknes* disaster happened on January 19th 2004, in the area of Vatlestraumen in the approach to Bergen. The accident claimed 18 human lives. *Rocknes* hit a shoal and capsized in a matter of a few minutes. The oil spill combatment operations that followed were the most extensive and costly oil spill protection action ever taken in Norway. In particular, the cleanup operation in a densely populated area required great care and coordination of substantial resources and a number of involved parties. The following towage and salvage operation was also unique in character, and represented a new challenge for the Norwegian Coastal Administration. The action costs were 108.5 millions NOK (16.5 millions USD).

The operation was led by the Norwegian Coastal Administration (Kystverket). The Administration's standard routines on sea accident alert were used accordingly, and they proved to be effective. The management of the oil spill combatment operations also functioned as expected. In all major aspects, the emergency response plan and the procedures defined by it were used. A great number of organisations and companies also contributed to the operation. The total amount of clean oil collected was 226 tons. In order to determine the extent of the oil leakage, The Coastal Administration expects more detailed information from the ship owner on the amount of oil carried by the wrecked ship.

The owner of *Rocknes* and thereby the polluter, represented by Jebsen Management AS, has estimated its own efforts to secure the wrecked ship. In the

beginning, the Coastal Administration was involved only in the supervision of the action. However, the Norwegian Maritime Directorate, and later also Det norske Veritas, have joined the Coastal Administration in the assessment process of the accident.

18 people were missing after the accident. Many were believed to have been trapped inside the ship. Human lives and health have first priority in sea accidents, regardless of environmental considerations. The police were responsible for securing the wrecked ship and the adjacent area for rescue operations. Any form of OSPR actions in the vicinity of the wrecked ship were not the immediate priority until the human rescue operation was completed.

Oil spill response action on sea

Oil skimming on the sea was put into action when the Rescue Centre cleared the area on January 19th at 11:43. The first booms for oil collection were afloat January 20th, 00:20. During the night of January 19th-20th, more units joined the oil spill combatment operation. At 05: 00 three oil booms were in action. The owner (and insurer) obtained additional advice from International Tanker Owner Pollution Federation Limited (ITOPF) to assess the measures carried out by the action administration.

On-shore action

The on-shore clean-up operation started on January 19th, and was carried out in several phases. Advanced

Figure 5.25 After the *Rocknes* accident 45 kilometres of coast were cleaned from January 19th - June 11th 2004. 85.5 tons of oil were collected in this cleaning operation.

Figure 5.26 The Rocknes accident on January 19th 2004 caused the loss of 18 lives, and is so far the most expensive oil clean operation in Norway, the total cost being NOK 108.5 million.

oil spill combatment depots were established in each of the affected municipalities. The crews comprised squad leaders from the inter-municipal emergency response association, municipal employees, personnel provided by Aetat and volunteers. In the emergency phase, personnel from the Norwegian Armed Forces and the Civil Defence took part in the operations. The requirement to provide the adequate number of personnel as prescribed by Health, Safety and Environment (HSE) was complied with. During the action, a total of three incidents of personal injuries were registered.

The clean-up was carried out along a 45-kilometre shoreline, divided into 181 locations according to the respective landscape or district type. The affected coastal areas had densely populated districts, with a significant number of residential buildings - permanent as well as seasonal. In addition, the area was shielded, and hardly affected by the sea waves.

Consequently, there was no natural washing, which is normally an important onshore clean-up factor. The piers, especially stone piers, stonewalls and breakwaters, were a big challenge for the onshore clean-up. Because the area lacked the self-cleaning capability, the clean-up standards were demanding. For this reason, the action required a considerably larger amount of effort in respect to financing compared to onshore cleaning during earlier oil spill combatment actions.

The state-controlled onshore operation was completed on June 11th 2004. The local authorities carried out minor clearing operations throughout the summer.

Another serious challenge during the action was waste management. A large amount of oil-contained waste was collected and carried to a special recycling plant. During a recycling process, oil is separated from other substances in order to reduce waste and to determine the volume of the collected oil. During the operation on the sea, the teams collected 140.5 tons of oil Onshore the volume of the collected oil was 85.5 tons (Norwegian Coastal Administration).

***Cristoforo Colombo* accident in Sakhalin, Russia**

Storms and strong winds now and then force ships onshore. Along the Arctic coast of Russia, there are many stranded ships along the coastline. Some of them are brought there by the winds, others on purpose by the owners. The *Stepan Razin* accident in the Kola Bay in October 2004 is an example of strong winds sending a ship onshore. The accident with *Cristoforo Colombo*, which is described below, is another example of this. The information on the *Cristoforo Colombo* accident was taken from Itar-Tass, the Moscow Times, RIA Novosti and BBC Monitoring International Reports.

In the evening of September 8th 2004, *Cristoforo Colombo* ran aground during a storm, and 189 tons of black oil and diesel fuel spilled from three damaged tanks. When the Songda storm was approaching Sakhalin, the captain of the *Cristoforo Colombo* was ordered to leave the port of Kholmsk and sail out into open waters. However, the captain did not obey the order and, as a result, the ship was thrown against the shore. According to the captain, he had intended to start the engines and move away from the shore as the storm approached, but the engines would not start.

The Sakhalin Energy Company, the Shell-led consortium operating the 10 milliards USD Sakhalin-2 oil and gas project that employed the dredger, two days later said the vessel had a total of 323 tons of black oil and diesel fuel on board. The spill moved north from the Sakhalin port of Kholmsk, along the western coast of the island. According to the Mayor of Kholmsk the day after the accident, it stretched five kilometres along the coast line and continued to spread. The Sakhalin Environment Watch organisation reported that all sea birds abandoned the area of Kholmsk. The Emergency Response Headquarters reported on October 4th that there was a new oil slick off the coast of Sakhalin. The oil came from the ruptured tanks of the *Cristoforo Colombo*

Suffocating fumes were reported in the town of Kholmsk, and people were asked to stay away from the shore to avoid being poisoned. According to a spokesperson of the owner of the ship, the Brussels-based European Dredging Company, the owner had decided to hand over more than 120 tons of fuel oil to the town's boiler plants. Every effort would be made to clean up after the disaster. Booms were to be placed around the ship, and the fuel that had leaked into the sea would be sprinkled with sorbate.

On September 18th, ten days after the accident, engineers in the port of Kholmsk finished mounting a pipeline aboard the damaged Belgian ship *Cristoforo Colombo* to pump out the fuel still remaining in the vessel's tanks. The *Cristoforo Colombo* was then to be taken off the rocks, and the decision to pump out the remaining fuel was taken to avoid the risk of additional pollution of the harbour, which was likely to occur when this work started. Engineers of the Sakhalin emergency and rescue centre were working onboard the vessel to seal up major holes in the ship's bottom.

On September 22nd, rescuers had already pumped out some 30 ton of fuel oil and water contaminated by

Figure 5.27 On September 8th 2004 the *Cristoforo Colombo* was blown ran aground in a storm near Kholmsk on Sakhalin. 189 tons of black oil and diesel ran out into the sea from three damaged tanks.

petroleum products. The ships tanks still held at least 70 tons of petroleum products and 400 cubic metres of contaminated water. Work was underway on the Christopher Colombo to dismantle the equipment to boost its buoyancy. It was necessary to deepen the sea bed to refloat the vessel. At the time, it was estimated that the work would require much more time and effort, since it took 12 months to make the Sakhalin's dredging vessel *Lyutoga*, which ran aground near Kholmsk in 1991, seaworthy.

On November 17th, a storm destroyed about 45 metres of the dam being built around the *Cristoforo Colombo* in the port of Kholmsk. At the time, there were strong winds (35m/s) and waves of up to six metres. A spokesman for the Department of Civil Defence and Emergency Situations said experts had repaired the damaged part of the dam, and were continuing constructions around the ship. According to the experts' calculations, the 400-metre long dam around the ship, made from soil from the sea floor would act as a dock. Inside the dock, water would be 75 cm higher than the sea level, and the *Cristoforo Colombo* would be able to sail around the rocks she hit. Five ships were to be involved in pulling the *Cristoforo Colombo*.

Environmental activists renewed their criticism of Royal Dutch-Shell's Sakhalin venture, saying the oil spill off the Far East Island's coast was indicative of what to expect as Russia's largest foreign investment project goes forward. "We're seeing how dangerous this project is at its very earliest stages," said the chairman of the Sakhalin Environment Watch: "This is the sort of thing we expected to happen, but not so early on."

Figure 5.28 In 1991, the *Lyutoga* was blown onto land. It took 12 months to refloat the ship. In 2004, *Cristoforo Colombo* ran aground in a storm on the same site (picture).

Environmentalist groups had long criticised Sakhalin Energy for its plans to build a seabed pipeline, two offshore platforms and a liquefied natural gas plant in the pristine region. Their calls for Shell to do more to protect a group of rare grey whales that feed in the area, where the platforms were being built, forced the company to push its schedule back a year while it conducted studies to assess the effects the project would have on whale behaviour.

The World Wildlife Fund has said that one of the greatest risks during the early stages of a project the size of Sakhalin-2 comes from subcontractors who are not held to the same strict standards as lead operators such as Shell. "The company cannot guarantee that all the necessary precautions will be taken during the construction of the pipeline due to the high number of subcontractors it has hired to do the work," the WWF's Russian marine project coordinator has said. Sakhalin energy has too many subcontractors to name. Following the oil spill, a number of international environmental organisations reportedly called upon Royal Dutch Shell Group to suspend oil production under the Sakhalin-2 project.

On Friday September 10th, the federal judge of the Kholmsk municipal court dismissed the application filed by the local prosecutor supervising environmental protection in the area, who demanded that the ship's captain be taken into custody. The latter, suspected of committing a crime through negligence, returned aboard *Cristoforo Colombo* after spending two days in a solitary confinement cell of the local pre-trial detention centre. In the meantime, investigators continued their probe into the case.

On October 4th, the lawyers representing the captain of the *Cristoforo Colombo*, filed an appeal against the prosecutor's decision to file a criminal case in the Kholmsk city court, according to the regional Prosecutor's Office. The Kholmsk court rejected the appeal. The captain's lawyers appealed the city court's decision in the Sakhalin Regional court. Meanwhile, the inter-district environmental Prosecutor's Office continued its investigation, which began on September 14th. All documents seized from the vessel and the port's

services about the time when the ship ran aground were inspected. The reason for the captain's disregard for the storm warning, which was timely given to him by the port services was scrutinized particularly thoroughly.

On October 18th a bail of 2 912 000 RUR, the equivalent of 100 000 USD, was filed for the captain of the *Cristoforo Colombo*, and all the payment requisites were submitted to the Prosecutor's Office. The decision on a money bail - as an alternative measure to the restraint of freedom of a Belgian citizen - was taken by the Sakhalin Nature-Conservation Prosecutor's Office, after the Kholmsk city court and then the Regional court refused to meet the Prosecutor's Office's request to put the ship's captain in custody. The Belgian captain had tried to shun responsibility and left the island without court permission, but was detained at the last moment at Vladivostok airport where he had arrived from Yuzhno-Sakhalinsk.

The spokesperson for the emergency centre said that by September 25th, the coastline had been fully cleared of the oil fuel pollution. A tentative estimate shows that the Russian side had suffered damages totalling over 57 million RUR (about 2 million USD). The captain of the ship was out on bail, but is still in Sakhalin.

6. Conclusions

The purpose of this report has been to present an overview of the level and extent of oil transportation within the Russian part of the Barents Region and further along the Norwegian coast. We have also presented knowledge about how operational authorities deals with oil transportation and how relevant environmental policies are stated in Norway and Russia. We hope that this information can contribute to more focus on oil transportation safety, and in this last chapter we give some recommendations in an 8-step, for us, logical order.

6.1 INTRODUCTION

All oil transportation represents a risk of oil pollution. It is complicated to remove oil and oil products discharged to land and water environments. Experiences from oil cleaning operations show that only 10-15% of the oil is successfully removed in Arctic conditions. From our point of view, this should lead to a strategy where the goal is a considerable reduction of oil spill risks. A central element in this oil pollution protection is related to overall oil transportation safety.

In this report, we have presented information related to a complete oil transportation line from the production site in Russia and transportation along the Norwegian coast. Today, a very small amount of oil is extracted in the immediate areas of the Russian part of the Barents Region. Most of it is carried over long distances and the transportation route starts in areas far away from the Russian Barents. Before it reaches the final destination, oil is transported by various transportation systems: pipelines, railway and tankers. The most extreme logistics system we find was the oil transportation line that originated in Talakan in the Republic of Sakha (Yakutia). From the Talakanskoye oil field, oil was transported via a local pipeline to Vitim at the Lena River where it was loaded into shuttle river tankers and carried north along the Lena to the coastal city of Tiksi in the Laptev Sea. In Tiksi the oil was loaded into 20 000 tons tankers and transported through 7 time zones along the Russian Arctic coast to the Kola Bay. Here it is reloaded into larger tankers of 100 000 tons deadweight, which go to Rotterdam and other harbours in Europe. Here it is likely that oil is reloaded again, and goes all the way to USA and other remote locations.

Before we continue the discussion about oil transportation safety and oil spill protection, we would

Figure 6.1 The tanker *Volgograd* from Lukoil-Arctic-Tanker underway along the coast of Northern Norway fully loaded with crude oil. The owner has in all ten new similar tankers built to operate in ice conditions.

like to underline some elements that influence the level of oil prevention and combating standards:

1. Oil spills will happen – oil transportation will lead to increased risk of accidents, but the level of risk can be assessed
2. Oil spills are in most cases detected too late and most of the spilled oil will never be removed
3. It is resource demanding and therefore expensive to clean up oil spills.
4. It will be a political question how much oil spills a society will tolerate - prevention expenses will be evaluated against the costs of cleaning up after the accident
5. Improvement of regulations always takes place after accidents have already happened

6.2 TARGET ISSUES IN RELATION TO OIL SPILL PROTECTION

In the following presentation about oil transportation safety, we have structured our reflections and comments in some selected categories, which we recognise as central in oil spill protection.

We have divided oil spill protection into eight categories:

- regulations
- notification of hazardous cargo
- human factors
- eligible equipment
- professional transport operators
- traffic controls
- towage capacity
- mechanic oil spill protection

All these factors are essentials to efficient oil spill protection and often work simultaneously, regardless of the fact that they are partially dependent on each other. In this respect, it is important to emphasize that oil spill protection in a broad sense is both extensive and dynamic. It is extensive because it contains numerous elements both public and private in character. It is dynamic because conditions and the framework of it in each and every area are constantly changing.

Figure 6.2 Hydro's own terminal in Sture has few and small spills. The terminal does not have any negative effect on the marine environment around the terminal.

6.2.1 Regulations

Laws and regulations provide a framework for human behaviour and every land adjusts and improves their normative guidelines constantly. After extensive disasters such as *Prestige*, authorities tend to make considerable progress in the development of regulations.

Both in Russia and Norway the legislation and regulations in the area in question are well developed. Based on practical knowledge and information from newspapers and reports, our experience is that there seem to be some differences in how the countries are managing their regulations. In Norway the authorities have adequate resources and therefore the possibility to control every operation whenever they want to. In Russia, the reality almost seems to be the opposite. There the control bodies seldom have the infrastructure or budgets to perform the necessary check upon personnel and infrastructure.

6.2.2 Notification of hazardous cargo

This report has documented that transportation of hazardous cargo (oil products are also defined as hazardous cargo) along the Norwegian coast is increasing. One way to deal with this is to establish a warning system based on notification from marine vessels with

hazardous cargo entering the Norwegian Economic Zone. Norway and Russia have been negotiating the agreement on hazardous cargo notification since 2003. The agreement will enable Norwegian authorities to prepare themselves for the approach of hazardous cargo to the Norwegian Economic Zone, which is very important for Norway. And the agreement should be of significant importance for Russia also.

6.2.3 Human factor

The human factor is always important in obtaining successful results. In transportation activities, crew with sufficient education and high working morale will substantially reduce the risk of accidents. One of the best prevention measures in reducing the risk of oil spills is probably to ensure that the crew operating the oil transports are well educated and have good technical skills. If we add high professional morale to this, we will make a big step towards the efficient prevention of accidents.

The theoretical knowledge must exist in combination with practical experience. Theoretical knowledge about oil spills has little value for a person who collects oil from the sea surface and does not have equipment or has never been trained in how to collect oil.

In emergency situations, the responsibilities and priorities must be clarified beforehand. The participants must know what institutions and persons must be contacted and the people in charge must have the necessary licenses in order. The personnel must be trained through emergency exercises both on paper and in the field. The difficulty with exercises is that they cost money and for this reason they are not often highly prioritised in both countries.

6.2.4 Reliable equipment

Good equipment in combination with well skilled workers helps to prevent disasters. Good equipment in combination with unskilled workers and low morale can increase the risk of accidents in addition to wasted financial resources. Bad equipment and workers with low education and low professional morale represent an even a higher risk of accidents.

In Norway it is not so easy for a transport operator to function with insufficient oil spill protection equipment. The control from the authorities together with input from trade unions and environmental organisations will draw attention to poor conditions in the matter of prevention and will damage the company's reputation.

Figure 6.3 A train with oil freight in Kandalaksha on the way to Murmansk in September 2004. In the early winter of 2004, on sidetracks approaching Murmansk, there stood 1500 tank cars with oil and coal awaiting unloading.

In Russia, on the contrary, in this field one can come across different realities and see two extremes. On one side there are entirely new top high-tech modern facilities, and at the other end of the scale, enterprises that are using outdated equipment and low professional morale.

6.2.5 Professional transport operators

In international shipping control is recognised as a basic standard. National authorities and professional associations undertake frequent inspections, based on international regulations for shipping in international waters. Russia has on the other hand a fleet of smaller vessels that operate only within the framework of national regulations. Most of the fleet that was built in the Soviet time and is now outdated, operates on domestic routes – in large rivers, canals and coastal waters.

The tankers that carry oil from the Russian part of the Barents Sea along the Norwegian coastline mostly are of good technical standard.

In Russia the pipeline operator Transneft has a monopoly to own and operate oil trunk pipelines. Oil companies themselves can only own local pipelines. Now there are more private oil companies that also want to build and operate trunk pipelines to transport their oil for export.

In Russia large amounts of oil are transported by railway. Russian Railways (RZD) has a monopoly on

railway network development. Large parts of it are under repair and modernisation. Oil companies that want to use railway for oil transportation often invest in the part of the network they are using to transport their own oil. That helps to modernize a considerable amount of railway network and it is a positive factor for all the railway customers.

It is important that the transport operators are continually inspected and controlled so everyone can have sufficient information to select the most reliable and safest ways of transportation. In case of oil transportation, it can reduce oil pollution risks.

6.2.6 Traffic control

Both Norway and Russia shall develop control systems for ship traffic in the Barents Region. Norway will have a new traffic control centre operative in Vardø in 2007. In Russia such a centre should be established in Murmansk.

In the modern society one can expect that the authorities must have full control over ship traffic all the time. This is a condition so that in case of difficulties ships will be provided with adequate help, and it presupposes that the help can be provided before a disaster can strike. Not longer than September 22nd 2004, the traffic control centre on Fedje (Vestlandet – not far from Bergen) interfered in time and prevented a gas tanker from running aground.

Traffic control functions are to:

a) track all ship movements – register and identify;
b) stay in constant dialogue with ships;
c) respond and act as required by the situation.

It is desirable that traffic control also has dynamic biological data as a background for traffic control activities. It mostly concerns spawning grounds, large concentrations of sea birds and the like.

Figure 6.4 From the helicopter one can see the Fedje traffic control with the residential district of Fedje in background. Fedje traffic control controls one of the busiest traffic zones in Europe. In Europe only Rotterdam has a larger amount of ship traffic through the year than Bergen and the adjacent sea area.

6.2.7 Towage capability

Every oil tanker can be considered to be a threat to the environment unless one has a sufficient towage capacity. The traffic control must have a possibility to summon tugs when the situation calls for it. The towage capacity both in size and number must meet the requirements at all time. When the oil traffic from Russia started in 2002 the tankers were mostly small. Today we see the appearance of less numerous but far larger ships with a steadily growing total volume.

The ideal situation for oil traffic is when the Norwegian authorities are notified by the Russian authorities about the approach of an oil tanker two days prior to its entry into the Norwegian Economic zone. This will give the Norwegian authorities time to arrange the available resources such as towing vessels and other ships available for towing. Without notification, there is too little time to plan the use of the resources.

6.2.8 Mechanical oil spill protection

The notion of oil spill response is associated with events when resources are put into action because something has gone wrong and they are needed to skim oil from the sea surface or clean up the beaches.

A disaster can happen regardless of how well one is prepared. From time to time, it happens and sometimes it is quite serious. *Exxon Valdez*, *Prestige*, and a recent disaster in Alaska are examples of when the situation gets extremely serious and it has significant consequences for people, environment and economy.

Oil spill emergency response system in Norway consists of personnel and materials from respective authorities on all levels of oil companies' management. Oil spill emergency response systems are relatively well developed around the large terminals such as, for example, Sture and Mongstad.

The same may be said about other areas in Southern Norway with its huge ship traffic. In Northern Norway the situation is different for two reasons: larger territories and the present state of oil transport from the Russian part of the Barents Region. In Russia there is less equipment for protection than in Norway. When one compares the countries, the situation is substantially better in Norway than in Russia.

While Norway has relatively little traffic in ice covered areas (only in Svalbard), in most parts of Russian Barents the operations continue in ice conditions six months of the year.

The practical cooperation between oil spill emergency response units from Norway and Russia works well. The Russian oil spill prevention and response authorities want to reach the Norwegian standards for equipment, knowledge and readiness. Norway and Russia must find a way to work together where Norway can provide with technical and scientific assistance for their oil spill prevention and response partners.

The focus must be on prevention. The challenge is that it is difficult to demonstrate results of prevention work although it is obvious that the costs when a disaster strikes will be enormous.

Figure 6.5 The tug *Ajax* was involved in a rescue operation September 22nd 2004 when the gas tanker *Marte* was rescued 30-50 metres before she crashed into the rocky coast at Fedje. Here Ajax is in a routine towage operation.

Figure 6.6 The equipment of the Norwegian Coastal Administration stored at Ågotsnes outside Bergen. A lot of material from here was used for the clean-up after the *Rocknes* accident that took place near Bergen on January 19th, 2004.

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7.1.2 Internet portals

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Lloyd's List – www.lloydlist.com
Logistic transport and customs portal – www.logistic.ru
Russian logistic services and links – www.loglink.ru
Russian rivers portal – www.infoflot.ru
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7.1.3 News and information agencies

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IA ATK-Media – www.atkmedia.ru
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7.1.4 Newspapers, weekly papers and Journals

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8. Abbreviations

AIS - Automatic Identification System
BAT - Best Available Technologies
CCB - Coast Centre Base
EIA - Environmental Impact Assessment
FEMCO - Far-East Marine Company
FSO - Floating Storage and Offloading Vessel
HSE - Health, safety and environment
IMO - International Maritime Organisation
ITOPF - International Tanker Owner Pollution Federation Limited
IUA - Regional Preparedness Area (Interkommunale utvalg mot akutt forurensing)
MARPOL - International Convention on the Prevention of Pollution from Ships
MBESD - Murmansk Basin Emergency and Salvage Administration
MNR RF - Ministry of Nature Resources of the Russian Federation
MRCC - Main Rescue Coordination Centre
MSC - Murmansk Shipping Company
MSU OSR - Marine specialised unit for oil spill response
NCA - Norwegian Coastal Administration
NEZ - Norwegian Economic Zone
NGO - Non-governmental organisation
NO NJHO - Norwegian Headquarter North Norway
NOFO - Norwegian Clean Seas Association for Operating Companies (Norsk Oljevernforening for Operatørselskap)
NOK - Norwegian krone
NSC - Northern Shipping Company
OSPAR - Convention for the Protection of the Marine Environment of the North-East Atlantic
OSPR - Oil spill prevention and response
POLREP - Pollution Reporting System
PPP - Polluter-pays-principle
RPK - Offshore oil transshipment terminal (Reydoviy peregruzoshniy kompleks)
RUR - Russian rouble
SFT - Norwegian Pollution Control Authorities (Statens forurensingstilsyn)
SMI - Specialised Marine Inspections under the Federal Service for Environmental Pollution Control (Rosprirodnadzor) of the Ministry of Nature Resources of the Russian Federation
SMPCSRA - State Marine Pollution Control and Salvage Administration under the Department of Maritime Transport of the Ministry of Transport of Russia
STS - Ship to Ship Transfer
USD - US dollar
VTC - Vessel Traffic Centre
VTMIS - Vessel Traffic and Information System
VTS - Vessel Traffic Services

Conversion factor for oil:
1 barrel = 159 litres
1 ton = 7.49 barrels