Oil Shipment in The Barents Region

Alexei Bambulyak, and Bjørn Frantzen

Abstract – Oil shipment in the Barents Region had insignificant volumes before 2002. In 2002, there was a dramatic increase in oil transportation, when 4 million tons of oil was shipped across the northern regions of Russia and Norway. In 2003, the volume reached 8 million tons. The trend continued in 2004, and about 12 million tons of export oil and oil products were delivered from the Russian Arctic to the western market along the Norwegian coast. In 2005 and 2006, the annual oil shipment volume was on the level of 10 million tons. The terminals loading Russian oil for export in the Barents Region have been continuously developed, and the overall shipping capacity has been enlarged.

In the recent study of oil shipment in the Barents Region we gave special attention to the existing and prospective offshore and onshore oil shipment terminals and their connection to the oil reserves on one hand and to the export routes on the other. We see now that even without a trunk oil pipeline to the Barents Sea coast, the annual oil exports from the Russian part of the Barents Region may reach a volume of about 50-80 million tons in the next decade. Crude oil and oil products will be delivered to the transshipment terminals in the ice free area of the Barents Sea by railway and shuttle tankers, and further shipped to export by line tankers.

Oil pollution prevention should be the central issue during oil transportation in the Barents Sea.

Index Terms — Barents region, loading capacity, oil shipment, transshipment terminals.

I. INTRODUCTION

Oil transportation from the Russian part of the Barents Region along the Norwegian coast had insignificant volumes before 2002. However, in 2002 there was increase in oil shipments, when 4 million tons of oil was transported across the northern regions. In 2004, 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. In recent two years, about 10 million tons were transported by that route annually. The terminals loading oil for export from the Russian Western Arctic seas have been continuously developed, and the overall shipping capacity has been enlarged. The changes in oil volumes carried for export through the Barents Sea during the recent two years were not so much dependent on the terminals’ capacities and logistic systems as on the external factors.

According to the analysis carried out by the Norwegian authorities, the annual export of Russian oil being carried along the Norwegian coast may reach the volume of 50-150 million tons in the next decade, and the size of oil transportation volumes depends on the perspective of constructing a trunk pipeline to the Barents Sea coast.

What we see now, is that the possible Northern pipeline would not play a major role in determining the oil volumes shipped in the Barents Sea.

In our recent study on oil transportation from the Russian North, we have given special attention to the existing and prospective offshore and onshore oil shipment terminals, and their connection to the oil reserves on one hand and to the export routes on the other. We have found out that even without a trunk oil pipeline to the Barents Sea coast, the annual oil exports from the Russian part of the Barents Region may reach a volume of about 50-80 million tons in the next decade. About 50 million tons of crude oil and oil products can be delivered by railway to the ports in the Barents the White seas. In addition, up to 20 million tons of oil will come from the northern oil fields in the Nenets Autonomous Region, and in the Pechora Sea. There will be stable increase in the amounts of oil shipped from Western Siberia. The terminals in the Kara Sea can load 2-3 million tons of crude oil for transshipment in 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 the 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 north-western Russia and northern Norway. Out of these three options only the northern one, the Barents Sea route, can provide the possibility of stable shipping large amounts directly to European and other major harbors, avoiding the challenges of transit through the neighboring countries or heavy traffic in the sea straits.

Oil pollution prevention should be the central issue during oil transportation in the Barents Sea.
II. OIL AND GAS PRODUCTION IN RUSSIA

The annual oil production in Russia has been constantly growing for the last eight years, and in 2003, the production level reached 408 million tons – the highest since 1992. The year after, in 2004, the oil production was increased by 50 tons and reached the level of 459 million tons. In 2005, Russia produced 470 million tons of oil and gas condensate, and in 2006 – 480 million tons (57% more than the 1999 level).

Natural gas extraction in Russia has been kept on a rather stable level for the last decade. In 1990s it decreased from 643 billion cubic meters in 1991 to 572 billion cubic meters in 1997, but since 2001 the natural gas production had steady growth and reached the level of 640 billion cubic meters in 2005, and 656 billion cubic meters in 2006. State owned Gazprom Company produces about 85% of Russia’s natural gas. In 2005, Gazprom extracted 547 billion cubic meters of natural gas (85.5%); and in 2006 – 551 billion cubic meters (84%).

According to the “Energy Strategy of Russia for the period to the year 2020”, the yearly oil production level should be 450-520 million tons, and the yearly natural gas production should be on the level of 680-730 billion cubic meters in 2020.

III. TRANSPORTATION SYSTEM OF RUSSIA

Russia has its most advanced transportation infrastructure in the European part of the country. The total annual transportation turnover in Russia, including pipelines, railway, automotive transportation, inner waterways and sea shipping and aviation, amounts to more than 4.5 billion ton-kilometers.

The significance of various transportation types is determined by their share in the total transportation flow. The major part of the transportation activity in Russia belongs
traditionally to pipelines and railways. The railways are main means of commercial transportation in Russia. Operational length of the Russian railways is 86.6 thousand kilometers, and 85% of them are located in the European part of the country. More than 1 billion tons of cargo per year is transported by railways in Russia (1.3 billion tons in 2006), where the oil shares are about 18% (228 million tons in 2006).

Trunk pipelines are the main transportation routes for Russian oil, oil products and gas. About 93% of oil produced in Russia is transported by trunk oil pipelines. The main pipelines are operated by state owned Transneft Company founded by the Government of the Russian Federation. In 2006, the Company piped 458.5 million tons of oil, including 251.6 million tons for exports, via its pipelines that had the capacity of 497.2 million tons.

IV. OIL SHIPMENT ROUTES IN THE BARENTS REGION

In 2002, 4 million tons of Russian oil was exported along the Norwegian coastline, in 2003 the amount doubled to 8 million tons, in 2004 it almost reached 12 million tons, in 2005 dropped to 9.5 million tons, and in 2006 rose to more than 10 million tons. Already in 2010, Russia may have the capacity to export up to 80 million tons of oil that way, and in 2015 the total capacity of the Arctic oil terminals can be over 100 million tons.

The coastal and offshore terminals listed in the tables I and II are built to send oil for export directly or via offshore transshipment terminals in the Kola Bay and even via terminals constructed in the northern Norway. These transshipment terminals are not listed in the tables.

It is not guaranteed that the above oil volumes will be shipped through the Barents Sea in three years perspective. But when the nearest plans of state and private companies to construct and expand pipelines, railroads, ports, and terminals are implemented, Russia will have transportation facilities to

| TABLE I | THE OIL SHIPMENT VOLUMES IN THE PERIOD 2002-2006. | TABLE II | EXISTING AND PROSPECTED TERMINALS CAPACITY. |
| # Site | Loaded, 2002 | Loaded, 2004 | Loaded, 2006 | Site | Capacity, 2006 | Capacity, 2010 |
| Laptev Sea | | | | | |
| 1. Tiksi | 60' | - | - |
| Kara Sea | | | | | |
| 2. Dudinka | 20' | - | 20' |
| 3. Dikson | - | - | - |
| 4. Ob Bay | 110' | 240' | 460' |
| Pechora Sea | | | | | |
| 5. Varandey | 200' | 560' | 500' |
| 6. Prirazlomnoye | - | - | - |
| 7. Kolguev | 120' | 80' | 80' |
| 8. Indiga | - | - | - |
| White Sea | | | | | |
| 9. Arkhangelsk | 1930' | 3450' | 3100' |
| 10. Severodvinsk | - | - | - |
| 11. Omega Bay | - | - | - |
| 12. Vitino | 2900' | 3700' | 3700' |
| Barents Sea | | | | | |
| 13. Murmansk | - | 3700' | 1700' |
| Murmansk | - | 3700' | 1700' |
| Mokhbatina Pakhta | - | - | 730' |
| Lavna | - | - | - |
| Pechenga | - | - | - |
| Laptev Sea | | | | | |
| 1. Tiksi | 100' | - |
| Kara Sea | | | | | |
| 2. Dudinka | 100' | 100' |
| 3. Dikson | - | - |
| 4. Ob Bay | 600' | 3000' |
| Pechora Sea | | | | | |
| 5. Varandey | 1500' | 12 500' |
| 6. Prirazlomnoye | - | 7400' |
| 7. Kolguev | 200' | 100' |
| 8. Indiga | - | 12 000' |
| White Sea | | | | | |
| 9. Arkhangelsk | 4500' | 7200' |
| 10. Severodvinsk | - | - |
| 11. Omega Bay | - | - |
| 12. Vitino | 11 000' | 12 000' |
| Barents Sea | | | | | |
| 13. Murmansk | 8000' | 10 000' |
| Murmansk | 8000' | 10 000' |
| Mokhbatina Pakhta | 2500' | 5000' |
| Lavna | - | 10 000' |
| Pechenga | - | - |

Institute of the North • Anchorage, Alaska • 1 907 771.2444 • institute@institutenorth.org
www.arcticenergysummit.org
export 80 million tons of oil by northern routes; and in 2015 this capacity may be increased to 150 million tons.

The trunk oil pipeline monopolist Transneft have elaborated the Northern project — building the Kharyaga-Indiga pipeline with the capacity of 12 million tons. In the meantime the oil companies, state and private, are going for oil transport by railway to the ports of the White and the Barents seas. With modernization of the Russian railway system going on in the north, rail alone can bring up to 50 million tons of oil for export in 2010. Besides, up to 20 million tons of oil will come from fields in the northern parts of the Nenets Autonomous Region and the Pechora Sea. About 3 million tons of oil may be shipped via terminals in the Kara Sea to be transshipped in the ice-free area of the Barents Sea. By 2015, new terminals can be built in the Kola and the Pechenga bays of the Barents Sea. The Dikson port will be a perspectives transshipment site when new oil and gas fields in Taymyr and the Kara Sea are developed. And Gazprom intends to build LNG plants in Yamal and Kola Peninsula.

It is seen from the above that even without the trunk pipeline to the Barents Sea cost the shipments of oil and gas from Russia passing the northern Norway will be significantly increased.

In the following articles we describe oil loading terminals (from east to west order) in the Laptev, Kara, Pechora, White and Barents seas. Most of the terminals are in operation, some have been closed, some are projected, but all of them aimed for shipping Russian oil for export via the Barents Sea.

**Tiksi, the Laptev Sea**

The Tiksi port (location 1, Figure 1) has not been shipping oil for export along the Northern Sea Route since 2002. However, Tiksi experience demonstrates one of the most complicated logistic system established for delivering East Siberian oil to the western market.

In 2001, the company Sakhaneftegaz in cooperation with the Murmansk Shipping Company started oil loading in Tiksi for shipping it for via the Northern Sea Route. The oil produced at Talakhanskoye field was delivered via local oil pipeline to the terminal on the Lena River. From there, oil was transported down by the Lena River with 2000 tons deadweight tankers to oil storage facilities in the port of Tiksi. In Tiksi oil was shipped to sea tankers up to 20 000 tons deadweight and delivered through 9 time zones to Rotterdam. The capacity of this transportation scheme was about 100 000 tons a year. In the summer of 2001, the port of Tiksi loaded 38 000 tons of oil for export, and in 2002 – 58 000 tons.

In 2008, Transneft plans to complete East Siberian – Pacific Ocean pipeline (ESPO) part to Talakan, and then Talakanskoye oil will be piped by ESPO to the east.

**Dikson and Dudinka, the Kara Sea**

Rosneft had plans to construct an oil pipeline from Vankor group of oil fields northwards to Dikson (location 3, Figure 1), and a terminal in Dikson for shipping oil to the west by the Northern Sea Route. In 2006, the direction was changed. Vankor oil will be piped southwards to Transneft pipeline system and further to the east by ESPO.

Dikson Island, a settlement and a port, is located in the north-eastern part of the Yenisey Bay of the Kara Sea on Taimyr Peninsula. By now, it has been the only sea port in the Kara Sea. The summer navigation period is about one month only, from mid August to mid September. When new oil and gas fields are developed in Taimyr and Kara Sea, the plans for constructing oil loading terminals in the ports of Dudinka (location 2, Figure 1) and Dikson can come back to the agenda. In 2002-2006, Dudinka port shipped 20–40 thousand tons of oil a year for export through the Barents Sea.

**Ob Bay, the Kara Sea**

In 1999, the RITEK Company made the first shipment of oil in the Ob Bay (location 4, Figure 1), and transported oil to the west by the Northern Sea Route. The oil, produced in the Western Siberia fields, is delivered via local pipelines to the petroleum storage facilities on the Ob River coast. There, oil is shipped to the river-sea tankers of 2100 tons deadweight of Irtysh River Shipping Company and transported down by the river to the Ob Bay of the Kara Sea.

In 1999-2005, oil delivered to the Ob Bay was shipped directly to shuttle tankers of with 20 000 tons deadweight offshore. In the navigation period of 2006, 40 000 tons deadweight tanker was moored in the Ob Bay and used as Floating Storage and Offloading vessel (FSO). Sea shuttle tankers transported oil from the Ob Bay by the Northern Sea Route via the Kara Gate to FSO Belokamenka (360 000 tons deadweight) in the Kola Bay of the Barents Sea.

In the period from 1999 to 2003, RITEK loaded in the Ob Bay and sent to export 470 000 tons of crude oil in total; in 2004 the amount was 240 000 tons; in 2005 – 357 000 tons; and in 2006 – 454 500 tons. RITEK plans to build a pipeline from the oil fields in the Western Siberia to the Ob Bay.
terminal with the capacity of 3 million tons a year.

**Varandey, the Pechora Sea**

The first oil loading terminal in Varandey (location 5, Figure 1) was completed and put in operation in 2000. The terminal in Varandey is one of the most promising in respect of providing 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. The terminal consists of offshore facilities connected by sub-sea pipeline with onshore oil depot, which stores oil from the northern oil fields of Timano-Pechora oil-and-gas bearing province. The existing capacity of the terminal is 1.5 million tons a year. In 2002, the Varandey terminal shipped 200,000 tons of oil; in 2003 – 400,000 tons; in 2004 – 560,000 tons; in 2005 – 600,000 tons; and in 2006 – 500,000 tons. Oil from Varandey is delivered by 20,000 tons deadweight tankers to FSO in the Kola Bay of the Barents Sea.

In the nearest future the existing Varandey offshore shipment facility will be replaced by a new one being constructed by Lukoil Company. Lukoil is building a new terminal with Fixed Offshore Ice-resistant Offloading Terminal (FIOROT) located 20 kilometres off the shore. FIOROT will serve tankers up to 70,000 tons deadweight all-year-round. Lukoil will implement the same oil export scheme, which is used now. Crude oil from Varandey will be delivered by shuttle tankers to the oil loading terminal in the ice-free area of the Barents Sea, and shipped to western market by line tankers. New Varandey terminal with the capacity of 12.5 million tons per year should be put in operation in 2008.

**Pirazlomnoye, the Pechora Sea**

Pirazlomnoye (location 6, Figure 1) is one of the largest oil fields opened in the Pechora Sea shelf. It was discovered in 1989. The field is located at the distance of about 60 kilometres from the shore, with the sea depth of 20 metres, the winter temperatures down to minus 50°C and ice thickness up to 1.6 metres. The cumulative oil production for the operation period of 23 years should amount to 75 million tons with the maximum yearly production of 7.5 million tons.

The marine ice resistant fixed platform Pirazlomnoy was assembled in the united structure – the topside units were installed on the caisson. The current plan is to complete the platform in 2007, and start the production on Pirazlomnoye oil field in 2008. Crude from Pirazlomnoye will be carried by shuttle tankers to offshore oil storage in the ice-free area of the Barents Sea; whereupon delivered by line tankers to Europe and USA.

**Kolguev Island, the Pechora Sea**

The Peschanoyozorskoye oil and gas condensate field in Kolguev Island (location 7, Figure 1) was discovered back in 1982 and put on stream in 1987. In 2002-2006, oil produced on Kolguev, some 100,000 tons a year, was shipped to 20,000 tons deadweight tankers and exported via transhipment terminal in the Kola Bay.

**Indiga, the Pechora Sea**

Indiga (location 8, Figure 1) is a small remote village situated in the western non-industrial part of the Nenets Autonomous Region. During recent three years, it is also a perspective area for building oil terminal ending Transneft’s pipeline to the Barents Sea coast. Tranneft proposes to build the Kharyaga–Indiga crude oil pipeline, and offshore terminal with the capacity of 12 million tons a year. The time-frames for construction of Kharyaga–Indiga pipeline have not been defined yet.

**Arkhangelsk, the White Sea**

Since 2002, Rosneft-Arkhangelsknefteprodukt has been involved in the oil shipment for export. The crude oil extracted in Timano-Pechora province is piped via the Transneft trunk pipeline Usa–Ukhta–Yaroslavl to the Privodino rail station where it is loaded to rail tank cars and transported further on by the Northern railway to the oil storage in Talagi near Arkhangelsk (location 9, Figure 1). Oil is shipped to shuttle tankers in Talagi then delivered to transhipment terminal in the Kola Bay – FSO Belokamenka and further to the western market by line tankers.

In 2002, the Rosneft-Arkhangelsknefteprodukt terminal in Talagi shipped for export 1.9 million tons of oil and oil products; in 2003 the volume was 1.5 million tons; in 2004 – 3.4 million tons; in 2005 – 4.2 million tons; and in 2006 – 3.1 million tons. By 2008, Rosneft-Arkhangelsknefteprodukt freight turnover of oil products should be to 10.2 million tons.
a year following the Arkhangelsk terminal development concept. The perspective plan of Rosneft is to increase the capacity of the export oil terminal in Talagi to 12 million tons.

**Severodvinsk, the White Sea**

Severodvinsk (location 10, Figure 1) seems as a suitable location for construction of the sea terminal. The town is situated on the White Sea coast. In 2003, Tatneft and ARM-Nefteservice companies stated their intentions of building an export oil terminal in Severodvinsk with the capacity up to 5 million tons. However, later both companies notified about changing their plans and looking for another location.

**Onega Bay, the White Sea**

The Onega Bay (location 11, Figure 1) of the White Sea was used for export oil transhipment operations during the summer navigation of 2003 by Volgotanker Company. 2700 tons deadweight tankers shuttled through 19 water-locks of the White Sea–Baltic canal to the Onega Bay and shipped fuel oil to 28 000 tons deadweight carrier tankers. In 2003, Volgotanker transshipped 220 000 tons of fuel oil in the Onega Bay. Apart from that, 100 000 tons of crude oil was carried from Vitino port and shipped to 127 000 deadweight tanker. The oil loading activities of Volgotanker in the Onega Bay stopped after the accidental fuel oil spill that happened in September 2003.

In 2004, the ARM-Nefteservis Company proposed to construct the oil loading complex in the Onega Bay with the capacity of 5 million tons a year, but the proposal was not further developed.

**Vitino, the White Sea**

The seaport of Vitino (location 12, Figure 1) is the first private seaport in Russia. It was developed as port terminal shipping oil to large tankers. The terminal was constructed using the capacities of the White Sea oil depot located in the Kandalaksha Bay.

Back in 1995, Vitino carried out the first export oil operation shipping crude to 31 000 tons deadweight tanker. That year, the port shipped 9 tankers with 250 000 tons of oil in total. Since 2001, Vitino has been carrying out large-scale modernization and reconstruction of the oil terminal in phases.

In 2002, the port of Vitino started to operate all-year-round. During winter navigation, oil is shipped to 20 000 tons ice-reinforced tankers, and shipment operations are assisted by the icebreakers. In 2005, the capacity of the oil terminal was increased to 11 million tons.

Crude oil and oil products are delivered to the port of Vitino by rail. Crude transported from the terminals in Yaroslavl and Moscow regions where it comes by trunk pipelines of Transneft. Gas condensate produced in Yamalo-Nenets Autonomous Region goes all the way by rail. In Vitino crude and oil products are shipped to sea tankers then delivered to the western ports directly or via offshore transhipment terminals in the Barents Sea. In 2002-2004, tankers of 20 000 deadweight shuttled between Vitino and the Kola Bay; and in 2005-2006 some offshore transhipment operation were carried out in Bøkfjord in the Northern Norway. In the winter 2006-2007 the STS operation was moved westwards to Sarnesfjord, near the North Cape.

In 2002, Vitino shipped 2.9 million tons of export crude oil and oil products; in 2003 – 5.7 million tons; the volumes dropped to 3.7 million tons in 2004, and in 2005 – to 1.6 million tons, including 830 000 tons of gas condensate. In 2006, Vitino terminal shipped 3.7 million tons of oil for export with the major part of light oil products.

**Murmansk and the Kola Bay, the Barents Sea**

The port of Murmansk (location 13, Figure 1) located on the eastern coast of the Kola Bay is the only ice-free seaport in the Russian Arctic. The Murmansk seaport is one of the largest seaports in Russia and the World’s largest seaport above the Polar Circle.
The freight turnover of the Murmansk seaport in 2006 exceeded 18 million tons. According to the general scheme of the Murmansk Port Traffic Centre development, the annual freight turnover may be increased to 42-65 million tons in 2010, and up to 83 million tons in 2015. In 2003 and 2004, two new coastal export oil terminals for unloading rail tank cars and shipping sea tankers were put in operation in the port of Murmansk. And in the period from 2002 to 2004, three offshore oil transshipment terminals were installed in the Kola Bay.

The Russian Ministry of Transport and the Murmansk Regional Administration proposes to develop Murmansk seaport as the multi-modal transportation complex building the infrastructure both on the eastern and western coasts of the Kola Bay and increasing the port’s oil shipment capacity.

The first coastal oil terminal was constructed at the Shipyard #35, in the northern part of Murmansk city. Crude oil and oil products are delivered to the terminal by rail and offloaded to 127 000 tons deadweight FSO moored at the terminal, then shipped to 100 000 tons carrier tankers that deliver export load to the customers. In 2006, Tangra Oil shipped 1.7 million tons of fuel oil for export. The terminal capacity is 5 million tons a year. Tangra Oil plans to increase it to 7.5 million tons a year.

The second oil loading terminal in Murmansk was based on the oil depot facilities of the Murmansk Sea Fishing Port. The export crude oil was shipped from rail tank-cars to 15 000 tons deadweight tankers that shuttled between the sea fishing port and offshore transshipment terminal in the Kola Bay. In 2003, the terminal handled 1.6 million tons of oil products, and 2004 – 2 million tons, including 1 million tons of export crude oil. In 2004, Murmansk Sea Fishing Port started a full-scale reconstruction of the oil shipment facility. The reconstruction was not completed, and in 2005 the export oil shipment operations were stopped.

The third terminal on the eastern coast of the Kola Bay was constructed north of Murmansk on the Mokhnatkina Pakhta Cape in Severomorsk District. The terminal for shipping fuel oil was built on the basis of the fuel storage of the Northern Navy. In 2003, Commandit Service Company and Sudkomgrupp Company started construction of the terminal for shipping fuel oil in Mokhnatkina Pakhta. The terminal with the capacity of 2.5 million tons of fuel oil a year was set in operation in December 2005. Oil is transported by rail Mokhnatkina Pakhta and piped to 68 000 tons deadweight FSO, and shipped to 50–60 000 tons deadweight tankers that carry oil to the western customers. In 2006, Commandit Service shipped 730 000 tons of oil products for export. Progetra Group intends to increase the terminal capacity to 5 million tons a year. Progetra (Commandit Service) and Sudkomgrupp also plan to built another oil terminal in Safonovo settlement near Severomorsk with the capacity of 15 million tons a year.

The first offshore oil transshipment terminal in the Kola bay was constructed by the Murmansk Shipping Company. In October 2002, the terminal transshipped its first crude oil. The terminal operated all-year-round and had the projected capacity of RPK-1 is 5.4 million tons of oil a year. From 2002 to 2004, the terminal ran Ship-to-Ship transfer (STS) operations. From 2004 to 2005, 127 000 tons deadweight tanker Trader was used as FSO at the terminal. Since Trader was moved to Shipyard #35, the terminal stopped operations. Oil was delivered to the terminal from Varandey, Vitino, Murmansk Sea Fishing Port and Shipyard #35 by shuttle tankers. Further, oil was shipped for export to line tankers with about 100 000 tons deadweight. In 2003, the terminal transshipped 3.7 million tons of oil for export; in 2004 – 4.3 million tons; and in 2005 – 3.4 million tons.

The second offshore oil transshipment terminal 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 the largest terminal, called Belokamenka was set in operation as a FSO facility in 2004. 360 000 tons deadweight tanker Belokamenka is the main unit of the terminal. After FSO Belokamenka was established, 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 further carried by shuttle tankers to the storage tanker in the Kola Bay, from where it is exported by line tankers with up to 200 000 tons deadweight.

In February 2004, the storage tanker Belokamenka received the first oil from Arkhangelsk. In March, the terminal shipped the first oil for export. In 2004, Belokamenka transshipped 2.5 million tons of crude oil for export, in 2005 – 3.3 million tons, and in 2006 – 4 million tons. The documented operational capacity of FSO Belokamenka today is 5 million tons a year. In the future it can be increased to 20 million tons. According to Belokamenka Company, the terminal can transship 12 million tons of oil in 2008, and when new oil fields are developed in the Russian Arctic, the terminal can handle 20 million tons of oil per year.

FSO Belokamenka receives crude oil delivered to the Kola
Bay by shuttle tankers from the terminals in the Ob Bay, Varandey and Arkhangelsk. In the future, Belokamenka will also handle oil from Prirazlomnoye oil field.

Ministry of Transport of Russia and the Administration of the Murmansk Region propose to build up the Murmansk multi-modal port complex using both eastern and western coasts of the Kola Bay. According to the new development plan, oil should be delivered to Lavna terminal by new constructed railway, and shipped to line tankers of up to 250 000 tons deadweight. The capacity of the oil terminal in Lavna should reach 10 million tons in 2008; and 25 million tons in 2012.

Pechenga Bay, the Barents Sea

Sevneft Company proposes to build a Severniy (Northern) Port – Oil Complex and Dry-cargo Northern Sea Port in the Pechenga Bay (location 14, Figure 1) of the Murmansk Region. The planned total freight turnover is 65 million tons a year, with the perspective to increase the capacity up to 200 million tons. The oil terminal has estimated shipping capacity of 30 million tons of oil and oil products a year. Oil will be transported to the port by rail, loaded to the oil storages and further shipped to tankers. Sevneft plans to start the construction in 2008, and the port can start operating in full scale in 2015.

Bøkfjord, the Barents Sea

Since the oil transportation from the Russian Barents Region started growing in 2002, there were visions and suggestions about the establishment of a transhipment terminal for Russian oil in the Norwegian County Finnmark.

In 2005, ShipCargo and Kirkenes Transit companies obtained official permission to carry out ship-to-ship (STS) oil transfer operations in Bøkfjord (location 15, Figure 1) near Kirkenes. Kirkenes Transit ran operations with gas condensate that was loaded from an inbound ship into tankers of up to 75 000 tons deadweight anchored near Reinøy in the Bøkfjord (Figure 3). Gas condensate was transported by rail from Siberia to the White Sea, from where it was transported further by tankers to Kirkenes. Fewer tankers came from Vitino port in the Kandalaksha Bay of the White Sea.

In 2006, the authorities put restrictions on oil loading activities in salmon protected area. Kirkenes Transip moved the terminal to Sarnesfjord near the North Cape in December 2006. And ShipCargo got a permit for STS operations in Bøkfjord in 2007.

Vadsø, the Barents Sea

In 2004 and 2005, there were discussions about establishing an oil terminal on the northern side of the Varanger fjord, by the province capital of Finnmark, Vadsø (location 16, Figure 1). The consideration about the terminal is to get a location for transhipment of Russian oil. The initial point of the plans is to transport oil with smaller shuttle tankers from North-west Russia to Vadsø and ship the oil into the tanker with 300 000 tons deadweight. From there the line tankers will go to Rotterdam and other large Western oil ports.

Sarnesfjord, the Barents Sea

The oil transhipment in Sarnesfjord (location 17, Figure 1) near the North Cape is the continuation of the activities that were carried out in Bøkfjord near. In 2007, Kirkenes Transit started gas condensate loading operations in Sarnesfjord. The operations in Sarnesfjord are conducted by 75 000 tons deadweight tankers. Each vessel has a capacity of carrying about 55 000 tons of gas condensate. The plans are to handle 2.2 million tons of gas condensate a season.
Kvalsund, the Barents Sea

The Kvalsund Municipality in the West Finnmark together with Kvalsund Næringspark, Polar Gjenvinning and Arctic Terminal Operating Company in 2006 initiated a project of establishing a port for oil loading and a service port for the petroleum industry in Kvalsund (location 18, Figure 1). The plan is to serve oil industry in the Norwegian and Russian sectors of the Barents Sea. The goal is to build rock caverns for oil storage, in which oil could be stored before being transported further to the world’s market by super tankers.

Sørøya, the Barents Sea

Nordoil Caverns Company together with Hammerfest and Hasvik municipalities are developing the proposal for building an oil terminal in one of two alternate locations at Sørøya (location 18, Figure 1) – in Slettnes, Hammerfest municipality or in Dønnesfjord, Hasvik municipality. Nordoil propose to build a storage for crude oil and oil products in rock caverns and a terminal for transhipping oil from Goliat field in the Barents Sea and from the Russian Barents Region.

Grøtsund, the Barents Sea

Grøtsund (location 19, Figure 1) near Tromsø, North Norway is discussed a possible location for ship-to-ship transfer of oil from Russia. International petroleum traders are looking at the possibilities for oil transhipments in this fjord close to Tromsø, the capital of the Troms County and a major city in the Northern Norway.

V. CONCLUSION

All oil transportation represents a risk of oil pollution. Seen in a European perspective, the volumes of oil transported along the Russian and Norwegian Arctic coast are not significant yet. Nevertheless, in the near-term perspective, this will 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 the 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 during part 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.

It is complicated to remove oil and oil products discharged to land and water environments, especially 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.

Today, a relatively 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 Barents Sea. Before it reaches the final destination, oil is transported by various transportation systems: pipelines, railroads and tankers. The oil pollution prevention system in the Arctic should establish common rules for operators, and be built on recognized international agreements and standards.

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REFERENCES


Alexei Bambulyak was born in Popov Porog, Karelia, Russia in 1971. In 1993, Alexei Bambulyak got a Master degree in Physics at Petrozavodsk State University, Russia; and after that took specialized courses in environmental management and project leadership in Russia, Sweden and Norway.

He worked in Petrozavodsk State University and Karelian Information Barents Centre, Russia before 1997. From 1997 to 2005, he was employed by Svanhovd Environmental Centre and partly by Akvaplan-niva, Norway. Since 2006, he has been working at Akvaplan-niva (Tromso, Norway) as General Manager Russia, and having part-position at Bioforsk Soil and Environment Svanhovd as an Advisor. In 2003, 2005, and 2007, he and his colleague Bjørn Frantzen were authors of the reports “Oil transport from the Russian part of the Barents Region” published by Svanhovd.
Mr. Bambulyak’s professional interests are in the fields of environmental and aquaculture cooperation in the Barents Euro-Arctic Region.

**Bjørn Frantzen** was born in Gudbrandsdalen, Oppland, Norway in 1953. In 1982, Bjørn Frantzen got a Master degree in Pedagogics at Lillehammer University, Norway; and after that took a number of courses in leadership and environmental issues in Norway and Russia. He worked in NGOs, at Norwegian Polar Institute as Director of Svalbard unit, and since 1997 he has been working at Bioforsk Soil and Environment Svanhovd, former Svanhovd Environmental Centre, (Svanvik, Norway) as a Project leader. He was a Chairman of the Ornithological Society of Norway.

Mr. Frantzen’s professional interests are in the fields of nature conservation in the Arctic, environmental and municipal cooperation between Norway and Russia.