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GROWTH Project GRD2-2000-30112 "ARCOP"

INDUSTRY INTERESTS IN THE NORTHERN SEA ROUTE

WP6: WORKSHOP ACTIVITY

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DELIVERABLE SUMMARY SHEET

Short Description
The workshop 6 report consists of the presentation abstracts and slides, a record of the discussions as well as the conclusions and recommendations.

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PREFACE

The oil and gas resources of the Arctic regions in Russia are the world's biggest energy reserve outside the OPEC countries. Due to their geographical location they are an important source in meeting the energy need in Europe.

There are a number of alternative routes for conveying oil and gas: direct pipelines, shipments across the Baltic Sea and direct carriage by ships along the Western part of the Northern Sea Route. All of these alternatives must be further developed to increase security of supply and cost-efficiency. The ARCOP project aims to develop an alternative that will make use of the Northern Sea Route.

Arctic Operational Platform ARCOP is a research and development project co-funded by the Directorate General Energy and Transport of the European Commission under the 5th Framework Programme for Research and Technological Development. The project coordinator is Kvaerner Masa-Yards. The project consists of six parts:

- Development of collection methods for ice information and ice forecasts in view of choosing transport routes (WP1)
- Assessment of the rules and regulations on transport by sea and of insurance and payment systems (WP2)
- Development of an integrated transport system for Arctic oil and gas transport (WP3).
- Development of the environmental impact assessment method and the environmental hazard management system (WP4)
- Trial in practice of the solutions developed and recommendations given during an actual transport assignment (WP5)
- Organisation of expert meetings between industry, authorities and representatives of technology to direct the project, to assess the results and to give recommendations (WP6)

The ARCOP project organises three workshops during every year of activity (2003-2005). Representatives of industries, authorities and scientific organisations are invited to discuss the topical issues of Arctic transportation. The workshops give guidelines for the project and also evaluate the results. During 2004, 102 participants, representing 55 organisations from all over the world, attended them. The workshops are arranged by the Ministry of Trade and Industry of Finland.

The sixth workshop of ARCOP, Industry Interests in the Northern Sea Route, was held in St. Petersburg, in October 2004. The first day of the workshop focused on service transportations and ore and metal transportations along the NSR. The second day of the workshop dealt mainly with oil and gas transportations.

The report consists of the presentation abstracts and slides, a record of the discussions during the event as well as the conclusions and recommendations. The conclusions and recommendations have been compiled by the project coordinator and the workshop organisers based on the presentations and the discussions heard during the workshop. The recommendations of workshops 4-6 have been written concurrently after the three midterm workshops in order to include all the views and guidelines presented by the workshop participants.

We wish to thank the chairmen, speakers and commentators for their valuable input to the successful and interesting sixth ARCOP workshop.

In Helsinki, 19.01.2005

Liisa Laiho
Piia Rahikainen
Kimmo Juurmaa

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EXECUTIVE SUMMARY

The objective of the sixth workshop was to elaborate industries' future transport needs on the Northern Sea Route and to assess ARCOP's progress from industries' point of view. The workshop was participated by 57 experts and 30 organisations from Russia and other European countries.

In 2003, the amount of investments to develop the transportation infrastructure of the Northern Sea Route was 150 mln USD. The federal Transportation Strategy the Russian government defines the NSR as the basis for northern transportation. The development and large-scale exploitation of the oil and gas fields in the northern Russia and on the continental shelf are facilitating the revival of the traffic by the NSR. It is hoped, that this positive development would lead to a situation where transit traffic from Europe to Far East and to west coast of the Northern America would become economically feasible.

The total cargo volumes transported by the NSR, excluding oil export, totalled 1,7 million tons in 2003. Transport volumes at Dudinka port totalled 1,2 mln tons, of which Norilsk Nickel's ore and metal transports constituted 1 mln tons. The Northern delivery programme and the commercial transport to northern population centres, operated by Murmansk Shipping Company MSCO, totalled 450 thousand tons. The NSR is important as an export corridor but also as a national transportation route.

Strong increase in the production of arctic oil and gas

The industries' transport scenarios project strong growth for the NSR traffic. The scenarios and the future needs are deriving from the rising crude oil price. The high price is allowing profitable exploitation of oil and gas fields even in the remote and arctic areas. According to the estimation of the state-owned oil company Rosneft, the Vankor oil fields, situated in the Western Siberia, are the largest reserve found in a decade. Rosneft plans to start production in year 2008. The maximum production, 15 mln tons, will be reached in year 2013. Rosneft's other arctic projects, such as the Prirazlomnoye oil field in the Pechora Sea, are progressing as planned.

Rosneft's transportation scenario is based on the utilization of the arctic oil terminals in Archangelsk and Dikson and the port of Murmansk. The scenario is relying on the availability of icebreaker assistance.

Tambeyneftegas estimates that the maximum production in the company's gas fields in Yamal peninsula will be 20 mln tons of liquefied natural gas (LNG) and 12,5 mln tons of condensate annually. Tambeyneftegas is also planning to transport its products via the Northern Sea Route using tankers that able to operate independently in ice.

Other companies are also projecting growth in production in the area and are relying on the NSR as an export route for their products.

Table: Estimation of transport volumes in Russia's arctic ports. Gazprom's fields in Yamal and in the Ob bay are not included (Source: FEMCO/ Tambeyneftegas/ LUKoil/CNII MF)

Port	Operator	Export volumes, million tons per year		
		2003	2010	Maximum
Archangelsk	Rosneft	2	4,2	7
Indiga	Transneft	-	50	50
Vitino	Yukos, LUKoil	5,7	6	6
Dikson	Rosneft	-	9,8	14
Varandey	LUKoil	0,4	12	20
Prirazlomnoye	Rosneft	-	5,9	7
Severodvinsk	Tatneft, LUKoil	-	5	15
Tambey	Tambeyneftegas	-	10	32,5
Total		8,1	102,9	151,5

Insufficient icebreaking services constraining growth

The Murmansk Shipping Company MSCO provides the icebreaker assistance of the Northern Sea Route. MSCO operates state-owned diesel and nuclear powered icebreakers. In practice, the service is relying on six nuclear icebreakers. These vessels have been built between 1975-1990. Although MSCO has invested in renovation of the vessels to prolong their service life by additional 10 years, the vessels will have to be put out of operation at latest by year 2015. At the moment, there is only one new nuclear powered vessel under construction.

It has been estimated, that to transport one million ton of cargo by the NSR, one icebreaker is needed to secure the transport. In the future every large, 100 000 dwt cargo vessel needs one, or preferably two, assisting icebreakers. The prevailing practice, in which an icebreaker is leading a cargo vessel convoy, is not sufficient due to the size of the vessels and the required speed of transport.

Last year 8 mln tons of crude oil was shipped from the White Sea and the Pechora Sea. If the oil and gas field project plans in the Russian north are implemented the way the industries are presenting them today, the current icebreaker fleet will not be enough to secure the transportation. Rosneft's future needs alone include six icebreakers. The needs of the different users have not been calculated to achieve a general view of the situation. According to the transport scenarios presented at the workshop, it seems that the minimum number of the needed icebreaker vessels would be as high as 20.

The Russian Ministry of Transport has not announced plans to renew the icebreaker fleet. Whether the companies will start to acquire commercial icebreaker vessels for each transportation task, remains to be seen.

Industries waiting for Russian government to make its move

The current fee policy of the Northern Sea Route was criticized in several workshop presentations. The ore and metal giant Norilsk Nickel, the most important employer of the

northern icebreaker fleet, is awaiting the Russian government to make considerable concessions regarding the fees if the cargo volumes start to rise as envisaged.

Norilsk Nickel's share of the NSR fairway dues is presently almost 70%. The company has started to build its own fleet able to operate without icebreaker assistance and is going to recommend the Russian government to adopt the Finnish fairway due policy. In Finland the fairway dues are collected according to a vessels ice class; the ships with the highest performance pay the lowest fees.

The financing of the Murmansk Shipping Company MSCO and the icebreaker fleet is depending on the fairway payments and lowering the fees would cause deficit in the company budget. The financial structure allows lowering the fees only if the cargo volumes transported by the NSR grow. The icebreaker fleet ages, therefore MSCO is expecting Rosneft and LUKoil to make their moves regarding the future of the NSR icebreaker fleet.

The deciding factor, when considering the future use of the Northern Sea Route, is proving to be the chosen fee policy. The present level of the tariffs may drive away the possible users to find cheaper routes for their products. The route will, however, have an important role as the oil and gas export route and the investments to maintain the service level should be started. For instance, to build a new icebreaker takes 5-10 years. The recommendation of the industries actively using the NSR is, that the Russian government should widen the financial base of the route to allow growth in the volumes.

A possible solution to the fee policy problem might be defining the icebreaker fees and fairway dues according to the future transport volumes. This would relieve growth impediments. In practice this would mean that the icebreaker service on the Northern Sea Route would be subsidized from the state budget until the target level of cargo volumes is reached.

PROGRAM	
October 12th Industry Interests in the Northern Sea Route	
Chairman: Nikolay Matyushenko, MMC Norilsk Nickel	
Opening address: Russian interests in the NSR	Alexander Olshevsky RF Ministry of Transport
Progress of the ARCOP project	Kimmo Juurmaa Kvaerner Masa-Yards / MARC
Experiences of production plants in using the NSR as an export route	Nikolay Matyushenko Norilsk Nickel
Service transportations to population centres in the Russian Arctic	Vsevolod Garulin Murmansk Shipping Company MSCO
Service transportations to population centres in the Russian Arctic	Olga Alexeeva RF Republic of Sakha
Polar Station activity, experiences and future plans	Alexander Danilov and Vladimir Sokolov Arctic and Antarctic Research Institute
October 13th	
Chairman: Erkki Kotiranta, Fortum Shipping	
Experiences and future prospects of oil transport in the NSR	Andrey Aprelenko FEMCO /Rosneft
Benefits of marine transportation	Erkki Kotiranta Fortum Shipping
Perspectives of the development of oil and gas fields in the Arctic region	Ivan Shestakov Gazprom
Future prospects of liquefied natural gas (LNG) transports in the NSR	Nikolay Bogachev Tambeyneftegas
Use of the NSR for through passage	Loly Tsoy and Anatoly Yakovlev CNIIMF
Use of the NSR for through passage	Joachim Schwartz, German Association for Marine Technologies
Non-commercial Partnership of the Coordination of Northern Sea Route Usages	Vladimir Mikhailichenko

1. RUSSIAN INTERESTS IN THE NORTHERN SEA ROUTE

A.N. Olshevsky, Transport Ministry of Russia

Abstract

The Northern Sea Route (NSR) as a historically established national single transport communication of Russia in the Arctic at all stages of its development was an integral part of the infrastructure of the economical complex of the Russian North. Development of the NSR was always given the priority in the state programs of exploration of the North.

In this connection, Russian interests in the NSR are always in the center of attention of all government bodies of our country.

President of the Russian Federation Vladimir Putin at the recent meeting (on September 27 this year) with leaders and participants of the expedition on drifting ice-floe Northern Pole-32 pointed at the exclusive importance for Russia not to lose material resources invested in the Arctic as a good basis for further steps of our activity in this region. Taking into account the necessity of the development of huge natural resources concentrated in the Russian Arctic, Putin emphasized special significance of communications in the North from geopolitical, economic and military points of view.

According to the provisions of the "Transport strategy of the Russian Federation" the Russian Arctic is assessed in the long-term outlook as a rich mineral and raw material source not only for Russia, but also for the Planet as a whole. The NSR forms the basis for the development of the arctic transportation system.

Strategic aims of the development of the NSR are as follows:

- retention of the NSR as a national main waterway of Russia in the Arctic;
- strengthening of the national security in the Arctic;
- transport provision for the exploration of arctic deposits, including offshore ones, of hydrocarbon raw materials and seaborne export of oil and gas;
- development of potential large-scale export, transit and coastwise transportation and of the northern delivery of socially important cargoes;
- formation of self-supporting profitable arctic seaborne transportation system;
- strengthening of the positive influence of the NSR on the social living conditions of peoples in the North.

In parallel with the Trans-Siberian Railway, the NSR is the second most important latitudinal transportation main line, a connecting link between the Russian Far East and western regions of the country. At the same time, an alternative and the shortest waterway runs along the NSR between the North-West Europe and the northern part of the Asia-Pacific region, north-western coast of the USA and Canada.

Therefore, it is no mere chance that everything related to the NSR is one of the most important components of the national politics of Russia in the sphere of transport, which with all our economical problems and budget restrictions is directed towards the development and perfection of the material and technical basis, the reorganization of control of the NSR as well as the creation of attractive conditions for users of this route. Only in 2003, more than 150 m. US dollars were assigned from different sources for transport technologies in the Arctic including completion of the construction of nuclear icebreaker "50 Let Pobedy", building of the ice resistant sea stationary platform Prirazlomnaya and of loading oil terminals.

Large-scale exploration of oil and gas resources on the arctic coast and offshore will be a basis of the revival of the NSR. Already this year, export of oil will reach almost 1 million t. Judging from the optimistic scenario of the development of economics of the North, by 2015 the transport boom in the Arctic is anticipated: volume of the seaborne transportation may increase up to 35 m t a year, out of which the sea export of oil and gas will be approximately 30 m t.

Mass transportation will be provided by 6 nuclear icebreakers, 4 diesel linear icebreakers and 2 supply icebreakers. For the transportation of oil the commercial companies exploring resources of the Arctic are starting construction of large ice class tankers.

Seaways of the export of oil through northern seas become more and more important not only for the transportation of oil from arctic deposits, but also from continental fields situated in middle and southern latitudes of Russia.

With all this going on, combined methods of transportation are used: by railway and pipelines up to northern terminals and further on by sea-going ships for export.

Via the ports of Archangelsk and Vitino (Kandalaksha) up to 5 million t of oil and petroleum products are shipped being delivered by railway mainly from the Volga region.

Transshipment installations are being designed near Indiga (Barents Sea), where oil will be supplied by pipeline from the Western Siberia (up to 50 m. t a year) and near the port of Dickson (Kara Sea), oil being delivered here by pipeline from the Vankorskoye deposit (up to 20 m. a year). Oil will be transported further by sea-going ships with a deadweight from 70 000 to 300 000 t.

Russia began the integration of the NSR into the world transportation system. At the international Euro-Asian conference on transport in 1998 the NSR is defined as the independent Euro-Asian transport corridor. Russia is objectively interested in the development of transit transportation along the NSR to the infrastructure of the NSR more actively and rationally, to ensure self-repayment of the arctic seaborne transportation system.

Encouraging and promoting the expansion of the international and commercial shipping on the NSR, Russia takes care of high standards of safety and protection of the environment. The Arctic is very vulnerable region and any accident with ship may result in irreversible consequences. Therefore the navigation of all ships on seaways of the NSR has to be carried out under the reliable state control and ensuring the escorting of ships by icebreakers.

2. PROGRESS OF THE ARCOP PROJECT

Kimmo Juurmaa, Kvaerner Masa-Yards Inc.

Abstract

ARCOP comes from the words Arctic Operational Platform. It is a research and development project for the Northern Sea Route. ARCOP is co-funded by the Directorate-General Energy and Transport under the 5th European Community Framework Program for Research and Technological Development.

The approach selected for ARCOP is a scenario based R&D project. The feasibility of Arctic marine transportation is assessed by a realistic transportation scenario. The feasibility is analysed for safety, technology and economics. The work within ARCOP is organized into 6 work packages each dealing with a special group of concerns. The seventh work package is to co-ordinate the Russian participation in the project and to make sure that the Russian knowledge and experiences as well as the Russian interests are properly considered in the work.

ARCOP scenario

The selected scenario to be used within ARCOP is oil transportation from Varandey to Rotterdam. This scenario was selected because it is realistic enough and because the common interests between Russia and EU can easily be seen here. Also the Southeast part of the Barents Sea can be seen as first step in developing a large-scale transportation system for the actual Northern Sea Route area.

The transportation volume that we will use in this scenario is 328.000 barrels per day or 16 million tonnes per year. Some previous studies have indicated that this volume is too small to be feasible in that area, but we consider this as an extra challenge for the project. During the project an economic model of the transportation scenario will be developed and the influence on the economics of each item of concern will be analysed. The transportation cost of one ton of gas condensate from Yamal to Rotterdam was 70 USD/ton during the ARCDEV voyage. Within ARCOP we try to find means that will result 15 USD/ton for the route Varandey to Rotterdam. With the same means we expect any transportation in the Arctic to become feasible.

WP1 Ice information

Previous studies as well as the Russian experience have shown that successful and effective navigation through ice is possible only when there is reliable information on the ice conditions and there is a method to use this information to select the optimum route. These methods to produce and analyze the data have been developed in Russia and also for the Baltic. Today there is an ongoing project IRIS (Ice Ridge Information System) which aims at producing reliable information and predictions for ridged ice on the sea lanes. This project is clustered with ARCOP and the actual adoption of the IRIS results into ARCOP will be started in 2005. So far the results reported within IRIS have been encouraging.

WP2 Legal and administrative issues

Most of the big concerns among Western investors are related to the legal and administrative issues. For this reason this topic has been selected into ARCOP.

By now it is clear that majority of the questions regarding the legal status of the NSR have been solved. There are some concerns regarding the freedom of competition and equal treatment as required by WTO agreement and these will be discussed within ARCOP.

Today the ice classification rules cause confusion internationally. Introduction of the new IACS Polar Classes will leave open the question of required power and this will then be decided by national authorities. There will be no method to have an ice class, which could be used as reference towards in the national guidelines. Also this topic has and will further be discussed within ARCOP.

One big cost item in the shipping is the insurance. There is very limited amount of background data to be used for this purpose and the insurance community needs additional information from the practise. On the other the work done for this topic indicates the willingness and interest of the insurance community to solve this problem.

We have also analysed the border crossing process and we will produce recommendations on how to minimise the loss of time for this.

WP3 Integrated transportation system

The core of ARCOP is the actual transportation system with the ships, the loading facilities and the required infrastructure.

So far we have developed the basic tanker concepts for different size of tankers as well as concepts for icebreaker alternatives that can assist these vessels. The economic analyses to compare the alternatives will be conducted early next year when all the basic data is available.

The shallow coastlines in the Russian Arctic means that the loading of large vessels must be done offshore. In addition to the offshore terminal this means sub-sea pipelines. Sub-sea pipelines present an environmental risk and need proper design. This problem has also been studied within ARCOP and the recommendations are to be developed.

In addition to the ships and terminals the marine transportation needs also qualified people. One of the findings within ARCOP so far is that there is very little of training for crewmembers of a ship intended for ice operation. This lack of international training of the marine personnel for ice operations appears to be a major risk. The large number of accidents that took place in the Baltic during winter 2003 was mainly due to human error.

Recommendations to arrange this training are urgently needed.

WP4 Environmental Protection

One of the major concerns among public and the European Commission is the environmental safety. Within ARCOP we are developing methodology for environmental impact assessment and for the risk assessment in Arctic navigation. The work done so far indicates that drifting grounding accident forms highest risk in the Arctic. This result

assumes that the ships have proper ice strengthening and ice damages are thus eliminated. Regarding the tankers probability for sinking due to fire or collision is estimated to be 0.5 % for 2003-2020. These figures and conclusions will be refined during the project.

In the environmental impact research we have been concentrating on the sea ice biota meaning the communities living actually in the ice. Sea ice biota is a vulnerable part of the Arctic marine ecosystem and obviously sensitive to oil spills. The oil spill effects will be assessed during the project.

In the oil spill response work we are concentrating on two alternatives, mechanical oil recovery and in-situ burning. The first report on this topic gives a good overview on the existing methods. Recommendations on how to arrange the environmental protection in the selected scenario will be developed.

WP5 Validation voyage

At the end of the project we are planning to arrange a validation voyage to demonstrate the project findings. One demonstration voyage the ARCDEV was arranged in 1998. This time we intend to focus more on the problems with large tankers and high transportation volumes, the selection of the route for this voyage will depend on the availability of commercial cargoes and large vessels.

WP6 Workshops

The core of the operational platform part of ARCOP are the workshops. They are intended for discussion and advice. We hope that as many of the interested parties as possible will join this activity and express their views, concerns and suggestions. So far there has been 5 workshops organised and they have been quite successful and useful for the participants and especially for the project.

All the workshop presentations, summaries of the discussion and the conclusion have been published on our website.

Targets of this workshop

In this workshop we have representatives of relevant industry and the presentation concentrate on the actual industry experience, existing needs and future plans. We hope that during the workshop we can compare the ARCOP work to the actual needs. The target is to get suggestions from the industry to further develop our work. At least following topics need to be discussed:

- The relevance of and suggestions for the ice information system
- Experience and wishes towards the insurance issues
- Suggestions on items and parameters to be studied in the economic analyses
- Needs for supporting infrastructure
- Experience and wishes regarding the crew training
- Experience and concerns regarding the environmental safety
- Required infrastructure for environmental protection
- Suggestions on potential validation objects and items

Discussion

Aker Finnyards (previously Kvaerner Masa-Yards) received an order to build an ice-going container vessel for Norilsk Nickel. Mr Matyushenko commented that Norilsk Nickel has been watching the development of arctic ship technologies very closely. Norilsk Nickel is planning to build an arctic fleet of its own and hopes to show the NSR administration that icebreaker assistance is not always needed.

Mr Juurmaa commented that it is a pity that the new vessel will be completed after the ARCOP project has ended, since it would have been interesting for the project as well to see the new vessel in operation. The experience that will be obtained from the operation of this vessel would be interesting to many of the ARCOP participants. The ways to arrange the observations and share the experience, should be considered.

3. EXPERIENCE OF THE INDUSTRIAL COMPANIES IN THE USE OF THE NORTHERN SEA ROUTE FOR TRANSPORTATION OF EXPORT GOODS – OPEN JOINT STOCK COMPANY MMC NORILSK NICKEL

Nikolay Matyushenko, MMC Norilsk Nickel

Abstract

As it is known, our Company develops deposits of ore minerals, produces a commodity output, procures the work and the life of the employees in severe conditions of Far North (capacities of Open Joint Stock Company MMC Norilsk nickel in Norilsk industrial region are located in territory of Taymyr autonomous region). Complex climate conditions and remoteness from "continent" always showed and will show specific requirements to transport component of our economic activities.

In distinction from many other industrial companies we have only two routes for transportation of cargoes and both of them - water routes: Northern Sea Route (NSR) and the Jenissey river. Sea transportations are carried out all-the-year-round, since 1979, with the use of vessels of an high ice class under icebreaker assistance - the break in such transportations in May - June arises owing to a floating of ice and flood on the river Jenissey; river transportations are possible according to hydrological and climate conditions only in summertime within 130 days in a year.



Figure: *Icebreaker assistance on the Northern Sea Route*

Transshipment of all Company's cargoes delivered to Norilsk industrial region by Northern Sea Route and intended to be delivered, is carried out at Dudinka port, which is the property of JSC MMC Norilsk nickel. The volume of cargo handling is about 1,2 million ton / year, including about 1 million tons of Company's cargoes.



Figure: Dudinka port



Figure: Existing high ice class vessel

JSC MMC Norilsk nickel is a metallurgical enterprise and earlier was never engaged in cargo traffic itself. As well as the last years, Open Joint Stock Company Murmansk Shipping Company renders transport services on carriage of cargoes of the Company by NSR using vessels (own) of the an ice-strengthened ice class. The shipping company carries out export transportations (ports of the Western Europe, the USA, etc.), and also internal (coastal) transportation of cargoes.

The nuclear linear (such as Arctica) and shallow-draft (such as Taymyr) icebreakers, which are the state property and in trust management of the Murmansk Shipping Company are used for realization of icebreaker assistance for transport vessels with cargoes of the Company by Northern Sea Route.



Figure: Nuclear icebreaker «Arctica»

The analysis of prospects of realization of transportations of cargoes of the Company on NSR on long-term prospect has shown, that there is a number of basic problem questions, which require decision, viz:

- the expenditure of a resource of steam generating plants of nuclear ice breakers. For prolongation of resources for 6-10 years significant means are required, which, as well as means for the current maintenance of ice breakers and infrastructures, can be received only due to the raised rates of icebreaking fee – MMC Norilsk Nickel already pays up to 80 % of charges of icebreaking fleet
- the icebreaking fleet can be replenished in immediate prospects (in 2005 - 2006) only with one nuclear ice breaker "50 years of the Victory ";
- petroleum business in a southeast part of the Barents Sea in the nearest 2 years: such serious consumers of icebreaking service, as Gazprom-Rosneft, Lukoil, etc. means that there is a real deficiency of icebreaking forces. Such deficiency will inevitably lead to redistribution of services of icebreaking fleet and for the benefit of other cargo owners and, accordingly, will lower the guarantee of transportations of our cargoes;
- the ageing and deterioration of transport fleet of the Murmansk Shipping Company - calendar period of 25-years operation of the vessels expire in 2007. We do not know about the plans of Murmansk Shipping Company on replacement of these vessels.

Thus, our transport component appears under influence of external negative factors and, if not undertake cardinal and, the main thing, operative actions, in some years we won't be able to take out the commodity output on markets and to provide our manufacture with material resources.

Distinctly understanding necessity and urgency of the decision of these problem questions, "The Concept of Creation of Optimum Transport System" has been developed in the Company. Within the framework of the Concept all possible ways of transportation of our cargoes are considered and analyzed, the ways of development of a transport component of Norilsk Nickel are determined.

Criteria of maintenance of economic safety of the Company and costs of realization of corresponding transport system were considered during development of the Concept.

By these two criteria the best conceptual approach is the following:

till 2009 we shall build our own fleet of 4-6 icebreaking-transport highly ice strengthened (LU 7 Russian Register ice class) vessels which due to application of new ship-building technologies and given capacity complying with the terms of navigation can transport cargoes by Northern Sea Route during all year with the minimal dependence on icebreaking support

The Concept is approved by a management of the Company. The decision to create optimum transport system on the basis of own fleet is accepted. Now work on its practical embodiment is carried out.

At the first stage the closed tender for arctic container ship for Norilsk Nickel among the companies - designers of the vessels, capable to carry out cargo traffic in Arctic regions during the most part of year without support of ice breakers has been organized. Domestic and foreign companies, which are leaders in the field of designing icebreaking-transport vessels, participated in tender.

The Finnish company Kvaerner Masa-Yards was chosen to be the projector according to the results of tender. This company has designed and has built a number of vessels of an amplified class, among which vessels of the double action, equipped with essentially new kind of propulsion system – a single azimuthing podded tipe rudder propeller unit – AZIPOD. The vessel Norilsk Nickel needs has the opportunity to move as traditionally a bow forward as stern forward as well (in heavy ice). Kvaerner Masa- Yards carried out model ice tests that have confirmed calculated navigable characteristics of a vessel at navigation in ice of Northern Sea Route. Leading scientific research centre of the navigation of our country - the Central Scientific Research Institute of a sea fleet - together with the Central Scientific Research Institute of Arctic and Antarctic Regions has carried out complete expert examination of the technical decision of the Finnish company.

Main dimensions of our future ship:

Deadweight	about 14 500 t
Length max.	168 m
Breadth	23,1 m
Draught, ice class	9,0 m
Power	13 MWt

At the second stage on a competitive basis the choice of shipbuilding shipyard for building of a head vessel has been made - the building contract with the Finnish shipbuilding yard Kvaerner Masa-Yards is signed on August 27, 2004. Dominant parameters became: cost and terms of the building, and also practical experience in building of vessels of the Arctic class.



Figure: Arctic container vessel

According to the contract the building of a head vessel of fleet Norilsk Nickel will be finished in February, 2006 and in March after natural ice tests in Jenissey gulf the vessel will be ready to participate in transportation of cargoes of the Company.

It is obvious, that realization of the Concept leads to cardinal change of all logistic of the Company.

Having own fleet, Norilsk Nickel provides for itself a necessary level of economic safety, independence of external negative factors of economic character. Thus there is a problem at a new qualitative level to coordinate work of all parts of our transport complex, including internal transport divisions of the Company, for maintenance of the most effective realization of transport process.

Discussion

Norilsk Nickel's new ice-going containership will operate between Dudinka and Murmansk, in an area where ice performance is needed. Norilsk Nickel is investing in ice-going ships to secure the transport of its products. The company says that it will be in place to start the discussions with the government when the new technology has showed its performance in practice. In 2006 the new ship's performance will be analysed. Norilsk Nickel wishes that the icebreaker fees the company pays would be reduced step by step after the company's new vessel has shown its ability for independent sail.

It is acknowledged, that the current icebreaker fees are deriving from the costs of the fleet. As the fleet ages, more funds will be needed for maintenance of the vessels. To promote the renewal of the fee system, Norilsk Nickel has recommended the Russian government to consider a progressive fee system that is based on ship's ice-class. This kind of system is in operation in Finland. The system favours new, high ice-class ships and thus supports the renewal of the ships.

The concept of an ice-going cargo vessel brings out new questions about fee responsibilities and liability issues.

Mr Matyushenko was asked to give his opinion on fee structure in a scenario where another ship is able to follow an ice-going ship in the arctic waters and an icebreaker is

not needed. Should the convoy pay the icebreaker fees or not, and whether the owner of the ice-going ship should benefit from assisting other ships. Mr Matyushenko said, that surely Norilsk Nickel is not hoping to benefit from its investment in the form of fee payments.

Normally the icebreaker is held responsible for any accidents occurring during escorting. If a ship operates without icebreaker assistance, it will be responsible for any accidents and will have the same liabilities as the icebreaker would normally have. The liability will include both environmental and hull damages.

Norilsk Nickel's decision to invest in ice-going ships was questioned from an economical point of view as well. Mr Matyushenko said that although he does not have the exact numbers, Norilsk Nickel has calculated that when the costs for building are included, the new ship will still reduce the transportation costs compared to the present level.

The Murmansk Shipping Company was established for two main reasons: to arrange ore transport for Norilsk Nickel and for a mining company located in Kola Peninsula. The two companies sought partnership to reduce the costs. But during the last 10 to 15 years, many companies have started to renew their transport systems and now aspire to organise their transports more independently.

Norilsk Nickel pays an icebreaker fee of USD 55 per ton, which constitutes 80 million dollars annually. The company says that the fees are too high and hopes for reductions in the fees. The company hopes that by investing in the ice performance, it could achieve this goal. At the moment, the transportation costs for copper and nickel are around 1-2% of the market price.

The company is, however, about to face the growth of ecological costs because the ecological taxation system has been introduced in Russia. Therefore the company is preparing an environmental programme for copper and nickel. Norilsk Nickel expects to spend about 1bln roubles on ecological taxes and environmental projects in the future.

MSCO mentioned the case of the Sevmorput, the only nuclear powered cargo vessel in the world. The vessel, 40 000 dwt in size, was designed to operated independently in the arctic seas. The ship's performance in ice was disappointing as it turned out that, due to the vessels size (breadth and length) the vessel is not able to operate in ice without icebreaker assistance.

MSCO receives 2,2 bln roubles funding from icebreaker assistance, including 1,8 bln roubles as tonnage fees. Norilsk Nickel's share of the fees is about 1,6 bln roubles per year. The company needs funds for the icebreaker fleet, so Norilsk Nickel has agreed to pay the needed fee. Norilsk Nickel is demanding for new negotiations regarding the fees as the new volumes of cargo enter the Northern Sea Route.

The negotiations will be difficult; Norilsk Nickel expects that by year 2006, when the new ice-going ship starts operating, the government will need to find more funds for the icebreaking fleet.

4. **MURMANSK SHIPPING COMPANY MSCO: EXPERIENCE IN SERVICE TRANSPORTATION TO POPULATION CENTRES IN RUSSIAN ARCTIC**

Vsevolod Garulin, Murmansk Shipping Company MSCO

Abstract

The Murmansk Shipping Company was founded in 1939 as a company specializing in transportation in the Arctic Region. Nowadays MSCO is the leading shipping company, providing year-round transportation along the Northern Sea Route.

The challenges of Arctic navigation

- Icebreaking assistance along transport routes and on terminals
- Demand for specialized cargo ships strengthened to ice-class 1A SUPER
- Vulnerable and harsh environment with strict peculiar requirements to the equipment and technologies
- Need for complicated technical solutions
- Creating of exquisite transport schemes
- Discharging to unequipped shore and fast ice
- High cost of equipment and its maintenance
-

Components of Arctic transportation infrastructure

- tanker 1A SUPER ice-class
- escort icebreaker
- transport vessel 1A SUPER ice-class
- shallow-draft icebreaker
- air service
- communications
-

MSCO's experience

- More than 60-years Murmansk shipping company secure icebreaking pilotage of transport vessels in high Arctic
- year-round navigation along the Northern Sea Route since 1978
- Ice management experience
- Pioneering in crude oil transportation in Arctic
- Unique terminal handling and supply
- Icebreaking pilotage and escort
-

Experience in crude oil transportation

- Company accumulates experience of hydrocarbons transshipment and transportation in Arctic
- Own ice-classed tanker fleet
- Export of crude oil from Varandey oilfield
- crude oil shuttling from Vitino with transshipment in Kola Bay

First submerged terminal in Arctic waters

The Arctic submerged loading terminal (ASLT) was designed for loading crude oil from shore oilfields of Varandey-Adzvin-skaja zone. The terminal was designed for year-round loading.

The features of the terminal:

- Safe technologies
- Reliable services: oil-spill response, tug management, icebreaking management
- Three levels of ecology protection
- Shipping in specialized tankers

The Northern Delivery Program

The state “Northern delivery program” is run to supply the distant points of the northern Russian territories with fuel, provision and other life-important cargoes, providing living conditions of the people during winter period.

In this program, Murmansk Shipping Company provides delivery to following areas: archipelago of Novaya Zemlya, Yamalo-Nenets, Taymyrskiy and Chukchi Autonomous National Areas and Republic of Sakha-Yakutia.

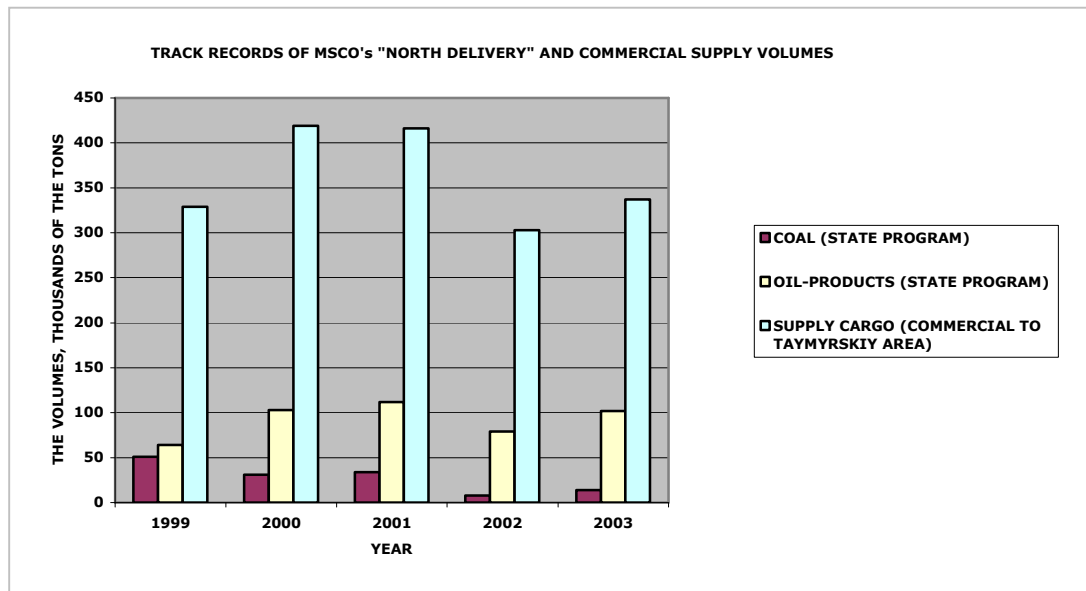


Figure: *Transport volumes during 1999-2003, the Northern Delivery programme*

Discussion

Mr Garulin mentioned in his presentation the cargo volumes of the Northern Delivery Program. The corresponding numbers of voyages are

- Coal 1 or 2 voyages
- Provisions, a few voyages
- Fuel, 96 voyages

The tankers MSCO uses are 15-25000 tons in size. In the slide, showing the annual cargo amounts (graph above), it can be seen that in 2002 the volumes went down. Mr Garulin explained that this was due to lack of demand for MSCO's services. Chairman Mr Matyushenko commented that it's good that MSCO is now committed to developing its' business areas, and widening them especially towards crude shipments.

According to the calculations, the icebreaking power available in the northern seas is decreasing. Only one new vessel “60 years from Victory” is being built, and the rest of the

fleet is getting old. Murmansk Shipping Company, as the sole nuclear icebreaker operator, has developed a program to prolong the lifetime of the icebreakers. The first vessel to be renovated is nuclear icebreaker Arktika; her lifetime will be extended by 50000 hours, equal to ten more years. The rest of the fleet will undergo the same program. MSCO feels that with the new vessel and the renovation program it can manage the growing needs.

Mr Garulin continued that MSCO is funded by the state according to the fleet costs and income. If the fees are reduced it means MSCO will lose the funds and so it is felt that the only way to decrease fees is to increase volumes. LUKoil and Rosneft have to come to the understanding about the icebreakers. If they do not reach an understanding, by 2015 there will be no icebreaking help available.

The Russian nuclear icebreaker fleet has been criticized in international press for being a potential environmental risk. Environmentalists have demanded deactivation of the fleet. Comparison between the environmental loads caused by nuclear and diesel powered icebreakers was brought into discussion. A diesel icebreaker equal to a nuclear icebreaker consumes 300 tons of diesel fuel per day. This is a big environmental load. Diesel powered icebreakers are reasonable until 30 MW power, and not beyond. Referring to this calculation, Mr Garulin stated that the nuclear icebreakers are better and environmentally sound.

He was also questioned about complete renewal of the nuclear icebreaker fleet, but he said that he is not aware of any plans to build a new generation of nuclear icebreakers.

Even if the RF Ministry of Transport had plans to build new icebreakers, 10 more years would be needed for the work.

The icebreakers are designed for 100000-125000 working hours. Extension of 50000 more hours is, however, safe; MSCO is a member in International Atomic Energy Agency IAEA and all the renovation work is done under IAEA's supervision.

MSCO commented that MSCO could support more transit traffic, but there is no demand for transits along the NSR. Maximum amount of cargo that can be served with the existing fleet is difficult to determine, because in summer the fleet has been engaged in other operations.

If fees were calculated based on the tonnage, the fee would equal 24 USD per ton.

- 5 million tons of cargo annually in the NSR (maximum amount transported has been 7,6 million tons)
- Icebreaker costs are 120 million USD per year (1 million ton cargo for each icebreaker)

Building a nuclear icebreaker is very time consuming. If a shipbuilder receives design parameters at the end of year 2004, a new vessel would operate in 2010 at the earliest. Design and constructing a ship alone is 2-2,5 years. Adding the power plant would take a few years as well. Building a nuclear icebreaker can be compared with building a nuclear power plant: the construction phases are the same.

5. SERVICE TRANSPORTATIONS TO POPULATION CENTRES IN THE RUSSIAN ARCTIC - ROLE OF JOINT-STOCK LENA RIVER SHIPPING COMPANY IN THE TRANSPORT SECTOR OF NORTH-EAST RUSSIA

*Minister V.M. Chlenov, RF Republic of Sakha
Presentation given by Olga Alexeeva*

Abstract

The Shipping Company is the only owner of river - sea vessels in the Lena River basin and in Sakha Republic (Yakutya), comprising also two powerful low-draft icebreakers and two sea tugs.

The fleet of the Shipping Company is used to transport cargoes from the Lena River basin and its tributary Aldan to destinations along the Northern Sea Route from Khatanga up to Pevek, calling at rivers Khatanga, Anabar, Olenyok, Yana, Indigirka and Kolyma.

The Lena River Shipping Company expands its cargo base each year with an average annual growth of more than 5 percent in its transportation and transport product volumes. Because of serious shortage in low-draft tanker tonnage and constrained financial situation, the Shipping Company has converted 25 low-draft river vessels from dry-cargo vessels into tankers, with total cargo capacity of 48 thousand tons. This has allowed to almost double the transportation of oil products from the central port Osetrovo, reloading cargo from low-draft fleet onto river - sea vessels, and to fully satisfy demand of the region in oil products and heating oil. Whilst carrying out the main volume of transportations for cargo recipients in Sakha Republic (Yakutya), the Shipping Company has offered highly acceptable conditions for transportation of coal for cargo recipients in the gold mining area of Bodaybinskiy in Irkutsk Oblast with total volume of 106 thousand tons.

After the radio centre of Yakutyan territorial administration on hydrometeorology and environmental monitoring in Tiksi was closed down, the Shipping Company has created its own system for radio communication with vessels in Arctic regions, using rented communication facilities of Tiksi and Nizhneyansk, which also allow receiving distress signals. The Shipping Company has equipped its ships with additional radio navigation equipment that is minimally required according to MARPOL and GMDSS, and maintains due level of staff and their skills.

For 10 years of its existence there has been no transport incidents in the Arctic involving vessels of the Shipping Company.

The Shipping Company has obtained wide experience in management of transport processes in the Arctic, and its experts skilfully apply flexible tactics of work with exact manoeuvring of vessels.



Figure: Map of Sakha-Yakutia

For example in 2004, this allowed to carry out vital deliveries to Arctic areas of Sakha Republic, Taimyr and Chukotka in conditions of Arctic navigation season which was 18 days shorter than last year and 7 day shorter than the norm.

During last five navigations seasons, cargo handling of sea tankers in destinations of the Republic, and loading of export saw-timber from Lena on dry-cargo vessels has always been carried out ahead of schedule or within it.

The Shipping Company has a special role in cargo deliveries to the Eastern sector of the Arctic, which form a quarter of the total amount of transportations. After seafaring shipping companies left the market of the Arctic transportations, the Lena Shipping Company has taken up delivery of practically all cargoes to the Arctic areas of Yakutya. Huge inflow of relatively warm fresh water from the northeastern rivers in August - September in the sector between Khatanga and Ambarchik creates favourable conditions for costal navigation by this type of vessels.

Last year they carried 375 thousand tons of different cargoes, including transit, from various points on the Lena River, and took 40 thousand tons of liquid fuel from sea tankers. The market of transport services rendered by the Shipping Company in the Arctic extends every year: beginning from 1997 the Lena Shipping Company delivers up to 90 thousand tons of coal from Zyrianka area (the Kolyma River) to Chaunsky in Chukotka. Since 1999 the Shipping Company has been serving a number of polar hydrometeorology stations located on islands. In 2000, according to a contract with Norilsk Nickel and administration of Khatanga area of Taimyr Autonomous Okrug it delivered 30 thousand tons of oil products and dry cargo to Khatanga port. This cooperation continues to deepen. Today for many clients the Shipping Company not only carries out transportations, but also deliveries products of its own companies and those of others.

During the current navigation season the total amount of deliveries in the Arctic increased by 10.6 %, or 415 thousand tons, compared with the level of 2003, including such directions as Yana (24.6 %), Indigarka (16.5 %), Tiksi (14.5 %) and Khatanga (double). Volumes to Kolyma have decreased by 8 % and to Pevek by 21,3 %. For the first time river - sea tankers of No 621 project delivered 8.6 thousand tons of oil products from Pevek to Kolyma. Chukotsnab Company has suggested expanding the geography of transportations of oil products further to the East up to the port of Schmidt's Cape.



On Yana, 40.2 thousand tons of diesel fuel was received from three sea tankers and delivered to oil depots. Unfortunately, the question of export transportation of Talakan oil has not been solved, and after unloading all three tankers went back with ballast.

Transition of economy to market relations has meant significant changes in mutual relations of actors participating in the transportation processes, and a number of new transport companies have started operating on the river. Anyhow today, summing up some results, it can be said that if the sheer number of operators was expected to solve the problems related to quality and volumes of necessary deliveries, this assumption has not justified itself. The main reason here is a change of state policy in financing vital northern deliveries. Apart from that, there are transportations of crucial importance for enterprises and settlements that cannot be carried out by small transport companies. These are mainly such deliveries as liquid and solid fuel, also mass deliveries of food and other goods (flour, timber, cement), which can only be done by water transport - there is simply nobody to carry them out, and they require a fleet of high capacity and manoeuvrability, capable to work in all sectors of our extensive basin. Only the Lena Shipping Company has such a fleet. The division of this fleet cannot be allowed by any means. It is enough to remember the navigation season of 1998 when strikes of miners, and then low water level of the Aldan River brought fuel supplies for the people and enterprises in Yana region almost to an edge of a catastrophe. The Shipping Company was compelled to bring all its low-draft dry-cargo tonnage and equipment to Aldan for trans-shipment on river - sea vessels in the river mouth, and later in Zhigansk area, as a consequence of falling water levels.

Therefore the Republic insists on including the Lena River Shipping Company into the list of strategic companies of the Russian Federation.

Huge territory (more than 4 million sq. km), extent of waterways (up to 18 thousand km), their variety and unstable hydrology, short duration of cargo delivery period (140-150 days on the main routes, 15-40 days on small rivers and 50-60 days in the Arctic) call for operative decision-making and implementation.

Under these circumstances, condition of waterways such as rivers and sea waterways in river mouths is of primary importance. As known, it is the prerogative of the federal centre and federal authority - the Ministry of Transport of the Russian Federation - to provide for reliability and guarantee the parameters of these main routes of the Republic.

Discussion

The importance of the NSR for the Republic of Sakha has several reasons. The republic of Sakha relies much on the sea link of the NSR, since many shipments are only feasible by the sea route. If the state doesn't make these deliveries, it will pose a real danger to the population. The only other possible transportation method is by air.

The development of the NSR is, however, connected with development of the mineral resources of this region. The resources of this area are valuable. The value has been estimated to be 5,4 trillion dollars. These resources can be delivered to industries only by the NSR. If the future of the area is considered, the development is closely linked with the development of the shelf, seas and oceans.

The NSR will also strengthen Russia's position in the Asian market. If the NSR tax and fee policy is chosen in the correct way, the route will become self-supporting and sustainable. At the moment all river and sea ports and navigable channels on the rivers are in a rather poor condition. The main reason for this is that the federal body has halted all funding of all its subordinate bodies. Therefore, for the sake of developing the NSR, it is very important to resolve these issues on the federal level to develop and adopt the federal program of the NSR. In a such program the governmental policy would be clearly defined in the part of renewing the fleet, the infrastructure of vessel services, maintaining the ships and maintaining all the sea and river routes in proper condition and in all other related issues.

The second observation (the second development) is that to keep the northern route and the northern areas supplied, high flexibility is required. It's necessary to include a joint river shipping company, and put it on the list of strategic enterprises.

Mrs Alexeeva was asked to give her opinion about the year round oil transportation service. She explained that nowadays the goods are transported via railways and by using trucks. It is felt that river transportation would be better, since reloading of the cargo from trains to trucks requires warehouse capacity and the costs are high. Also cargo losses are sometimes quite high.

Previously the region was supported by the NSR, and the support was better. Sakha develops a program for year round shipments to port of Tiksi, because from there the goods can be shipped onwards by river ships. Nowadays only 10% of the goods are transported by sea; the rest is transported from south by river.

Mrs Alexeeva stressed that economy and seasons are very important when deciding upon feasible transportation. At the moment there are a lot of environmental works going on in Sakha; banks and riverbeds have been destroyed, and rivers are getting shallower. Floodings occurred in 2000-2001.

The maintenance of the river routes has been neglected and now the reparations are consuming more funds than the maintenance costs would have taken.

The Lena shipping company is servicing the republic as a stock company. The shares are owned by Sakha-Yakutia and the Russian Federation. The interests of these two governments do not meet.

6. POLAR STATION ACTIVITY, EXPERIENCES AND FUTURE PLANS

Alexander Danilov and Vladimir Sokolov, Arctic and Antarctic Research Institute

Abstract

The Soviet and Russian scientific observations in the Arctic Ocean were based on a complex of observations that was carried out by the expeditions of the Arctic Institute.

Up to recent time, the research fleet, North Pole (NP) drifting stations, high-latitude airborne Sever (North) expeditions and the onshore network of polar research stations comprised an integral part of one comprehensive system of Soviet observations in the Arctic.

History of the expeditions

In mid-1991, Russia halted the continuous year-round observations of the ocean state in the Arctic Basin and in the Arctic Seas. In July 1991, the last NP-31 drifting station completed its operation. In May 1993, the last research flight teams of the Sever expeditions operated in the Arctic Seas.

The first Soviet drifting station, established in May 1937, operated for 9 months. During this period it has passed about 2500 km from the Pole to the southern Greenland Sea. The expedition, that organized the drifting station and conducted an extensive complex of scientific observations, was called the High-Latitude Airborne Sever Expedition. However, one drifting station conducting observations in a restricted area along the forced drift route cannot investigate a vast area of the Central Arctic over a short period of time. A method for organizing oceanographic studies was devised. It included landing of scientific teams on the ice from aircraft, conduct of observations for a period between several hours to 3-5 days and upon the end of work, transportation of these teams by aircraft to a different point.

This method made it possible to comparatively quickly fulfill an ocean survey over a large area at the designated points. These expeditions operated in 1941, 1948, 1950, 1951 and 1952. Several aircraft teams and small groups of scientists participated in each expedition. A disadvantage of these expeditions was that the studies at each point were of a short-term character and were performed only during a short period of time (April-May).

This is how we see the operation of drifting stations under the current conditions:

1. Possible area of landing – north of the New Siberian Islands
2. Landing by using the aircraft or ship-based variant
3. The camp is set up on an ice floe or an ice island with a possibility of constructing the runway
4. Planned operation period is more than a year
5. Research aims and goals:
 - Comprehensive oceanographic studies with a stress on mesoscale processes, especially during the transient periods - winter-summer, summer-autumn, i.e. during the periods of melting and ice formation, study of water masses focusing on the Atlantic and Pacific waters including their upper and lower boundaries
 - Study of fractures, polynyas and the related processes
 - Study of ocean-atmosphere interaction processes

- Ice studies, morphometry, growth and melting, behavior of the bottom surface, structure, etc.
- Validation of satellite data for a possible range of observations
- Meteorological and aerologic observations
- Ionosphere studies
- Biological studies

Logistics complex

- Diesel power station
- Galley
- Garage
- Medical block
- Radio shack
- Warehouses
- Fuel storage

Laboratory complexes:

- Oceanographic laboratory
- Hydrochemistry laboratory
- Biological laboratory
- Meteo-complex
- Upper-air sounding complex
- Satellite data receiving complex
- Ice laboratory
- Atmosphere-ocean interaction laboratory complex
- Ionosphere laboratory

Drifting station «North Pole –33»

Work of the drifting station North Pole –33 is planned for two years. The drifting station North Pole –33 has been launched from board of the research vessel Academician Fiodorov with the assistance of the atomic icebreaker. Joint expedition of these two ships followed for 16 days.

Program of scientific investigations at the North Pole Station has been drawn according to the following spectrum of problems:

- Study of the near-ice atmospheric layer
- Oceanographic observations
- Investigations of evolution of morphometric characteristics of sea ice cover
- Study of biological characteristics of sea ice
- Study of ichtyo-plankton and benthos communities
- Investigations of solid particles in the snow cover and sedimentary material transported by the ice cover
- Ecosystem investigations
- Sub-satellite experiments orientated on the study sea ice characteristics

Monitoring of environmental system in high latitudes in the Arctic will be conducted in the following disciplines:

- Atmospheric monitoring
- Monitoring of the ozonosphere
- Monitoring of the atmospheric surface layer and of the components of radiative balance
- Monitoring of environmental pollution

- Monitoring of hydrospheric parameters

Future activity development at the drifting stations North Pole

- Development of station infrastructure
- Increase of expedition members up to 24 – 30 and more
- Program extension in the field of marine geology and morphometry of the ocean floor
- Roshydromet planned to organize an international drifting station in the course of the International Polar Year 2007-2008

Discussion

The ice thickness under a station is normally 2-4 meters. The station has had to be evacuated two times (stations 7 and 32) due to icebreaker activity.

The polar stations are re-supplied by using aircrafts and ships. The projects are always very carefully planned and calculations are made to ensure the success of the expedition.

The polar station projects are financed by the state only. It was suggested that AARI could look for private investors to facilitate the expeditions. The AARI representatives said that they have looked for commercial funding, but have not found any interested organisations. It has also been feared, that the scientific credibility could be questioned by outsiders, if AARI included sponsors in their programs. Workshop participants denied these fears and urged AARI to look for partners for their future expeditions.

AARI was also questioned about the availability of the data obtained from the polar stations. AARI explained that for two years the data is property of the institute, after that the use of data can be discussed with other parties as well and it is commercially available.

7. EXPERIENCES AND FUTURE PROSPECTS OF OIL TRANSPORT IN THE NORTHERN SEA ROUTE

Andrey Aprelenko, Far-Eastern Marine Company FEMCO

Abstract

Oil Company Rosneft, controls over 40 affiliated stock companies in 21 regions of the Russian Federation: in Far East, Siberia, in Northern and Southern European parts of Russia. The company employs over 60,000 employees.

The source of natural resources of the company includes over 200 fields with total extractable resources amounting approximately 1,4 bln tons of oil and 4,3 trln cubic meters of gas.

The company possesses a strong and well-developed infrastructure of 78 oil-storage facilities and 605 gasoline filling stations. The annual turnover, including sales of oil products and transshipment services, totals approximately 20 mln tons.

Rosneft has one of the most active companies in Russia's far north. Rosneft is currently developing transport infrastructure in Privodino, Arkhangelsk and Murmansk areas. Development of the fields in adjacent regions is required to ensure high effectiveness of the performance.

FEMCO belongs to Rosneft Group, being the oldest division in the group. The Main business activities of FEMCO are:

- Cargo and passengers transportation, provision of anchor handling tug supply services to offshore drilling units, provision of other associated services and works;
- Offshore exploration and production drilling, offshore oil and gas-field development;
- All kinds of ship and drilling installation units broker services;
- Agency and ship chandlery services to vessels and offshore drilling units;
- Technical, operational and other kinds of management services for vessels and offshore drilling units operations

Rosneft's main areas of development in the North-west of Russia

Prirazlomnoye field project (2005-)

- The estimated total crude output during the project's lifespan: 74,6 mln t.
- Crude transported straight to Murmansk
- Fleet: 2 tankers of 70 000 dwt, 1 nuclear icebreaker, icebreaking multipurpose vessel

On-shore fields in Timan-Pechora (2008-)

- Max. 4,2 mln tons of crude annually
- Utilizes the port of Arkhangelsk
- Fleet: 3 shuttle tankers of 30 000 dwt, 1 diesel icebreaker

Vankor project

- Max. 14 mln tons of crude annually
- Utilizes the port of Dikson

- Fleet: 4 shuttle tankers of 100000 dwt OR 3 shuttle tankers of 150 000 dwt, 3-4 nuclear icebreakers, 4 assisting vessels

Marine transport infrastructure development project

- Includes the ports of Archangelsk, Dikson and Murmansk and Prirazlomnoye offshore field
- Shuttle tankers transport oil to floating storage offloading facility Belokamenka outside Murmansk
- Supertankers transporting oil from Murmansk to Europe and the USA
- The infrastructure includes an assisting fleet, shuttle tankers and the FSO Belokamenka

See the appendices for details.

Discussion

Mr Aprelenko said that FEMCO has a strong partnership with Bergesen in chartering storage tanker Belokamenka. The companies have agreed that FEMCO is providing all technical management, crew and it also manages safety issues. Mr Aprelenko continued to say that Belokamenka is the safest and best of all stationary tankers. The safety precautions have been perceived; instead of normal marine anchor, FEMCO decided to use anchoring technology that is used at offshore rigs. Minding these technical parameters such as the strength of the chain, she has no match in Russia, Aprelenko said. One problem is, yet to be solved: the mooring of a tanker by using a locating system. FEMCO said it has developed a way to solve the navigational problems related to mooring.

Mr Aprelenko was questioned about environmental certificates and plans to acquire such documents. He said that due to certain conditions, during the last 4-10 last years FEMCO has not been working with Russian-based contractors. Their drilling activity areas include the Persian Gulf and Sakhalin 1 project, where Shell is the main shareholder. FEMCO provides companies like Bergesen and Smith International inc. services such as technical, environmental and crew management. FEMCO also works with other big and well-known international companies, which shows certain level of quality in the company's operations, said Aprelenko.

Mr Aprelenko said that when designing the shuttle tankers for Prirazlomnoye offshore field, the two main qualities were valued: ability for independent operation and the manoeuvrability.

Mr Aprelenko was asked to elaborate on the draft of the shuttle tanker and the depth of the platform. Mr Aprelenko said that FEMCO would have wanted to continue the discussion on increasing the size and deadweight of the tanker, if the schedule hadn't been so tight. The details of the size have not been made public. FEMCO would also have wanted to develop the loading system, so that the engine of ship wouldn't have needed to be employed for dynamic positioning.

A representative of Lloyd's Register commented that the issues concerning tanker-icebreaker system are very important when discussing the safety of a transport system. Half a month ago the register reviewed the Prirazlomnoye project, and two important aspects were noticed. Firstly: the power requirements are not met. According to the present register requirements, the Russian requirements are not met either. Another problem is that there is no reliable information on how the transport system works in the

Pechora Sea. There is, however, some information available from working on the Yenisey River, the Barents Sea and the Pechora Sea.

The Lloyd's Register representative continued to say that there are certain questions regarding the controlling systems. The power requirements are higher than the available power. The Lloyd's representative concluded that FEMCO should be very careful in implementing the system without further studies. As one American admiral said 30 years ago: the reliability principle in the arctic should prevail over the efficiency. Lloyd's register recommended FEMCO to study this issue further and more closely in terms of power and reliability.

Mr Aprelenko answered saying that FEMCO would like to see the performance of the boat built for Norilsk Nickel. The rising oil transportation tells a lot about the situation. FEMCO needs to employ a lot of intellectual power in 2005-2006. FEMCO and Rosneft are now investing in the NSR; Mr Aprelenko said that the FEMCO is now requiring certain guarantees that the traffic is secured.

Representative of Murmansk Shipping Company MSCO commented two vessels working for Rosneft belong to MSCO. He continued to say that MSCO sensed positive moment in the presentation: Rosneft recognizes the importance of constructing new icebreakers for Dikson, because the volumes show that the existing fleet will not be enough. MSCO asked FEMCO representatives to specify, from who FEMCO is waiting the guarantees.

Mr Aprelenko explained that FEMCO needs a guarantee that the NSR will be functioning. Rosneft sees the tankers as a link in the old transportation technological chain and the investments to this link is a part of its own investments. Concerning support in the NSR such as navigation and icebreaker support, FEMCO would want some concrete knowledge that if it pays the tariffs, the government will provide the services. Aprelenko said that in his opinion, the icebreaker fleet and the NSR should be state-controlled. Aprelenko said that he didn't mention one important factor in the presentation: when looking at the number of icebreakers, the types of icebreakers, and the power of tankers, it is understood that one icebreaker cannot work only for one tanker. Therefore a feasibility study should be conducted, and the icebreaker assistance services should be transparent.

Mr Aprelenko mentioned the planned tanker sizes. A comment was heard that increasing the size of a tanker shouldn't be the main parameter. The draft of the vessel should be comparable with the width and the beam of the ship. In the arctic conditions of the Pechora Sea, a stamukha size 70 000 dwt tanker is quite large. It will be difficult to combine a tanker like that and icebreaker help in arctic conditions.

Mr Aprelenko was questioned whether FEMCO has made any mathematical modelling or ice tank tests regarding possibility of passing in the Barents Sea in ice conditions, at the stage of accepting the concept of tankers. Aprelenko answered that the size counts: the bigger the better. Mathematical model calculations and checking are run on paper. Central Marine Research and Design Institute commented that they have started discussing this issue of rather broad tankers with the width larger than the width of icebreakers. Mr Tsoy said that the information is available and CNIIMF is able to participate and be of certain help in resolving this issue. CNIIMF said it has got interesting results from a test. In the present situation it is possible to make mathematical calculations. CNIIMF has made a database to solve these kinds of issues for the wide tankers and their movement along the channel.

8. THE BENEFITS OF MARINE TRANSPORTATION

Erkki Kotiranta, Fortum Shipping

Abstract

The arctic region of Russia has become an area from which crude oil is exported. It has been estimated that the export of crude oil will triple by 2010. As volumes increase, the importance of ports and terminals will become more pronounced. Naturally, the objective is to lower production costs and, at the same time, transportation costs. When loading areas are located near the production site, costs will be reduced. Naturally, operating in an extreme environment the year round will pose problems.

Cost Efficiency

It is a known fact that maritime transportation is the cheapest per ton. When comparisons are made in icy conditions, the variables will be those that are constants in open water. What kinds of ships are being used, when icebreakers are needed and what the cost level is should all be taken into consideration. At the same time, it should be noticed that the operative steadiness of the terminal and a good traffic flow have great importance. Any disruptions in these will cause a rapid increase in costs.

Environmental friendliness: We can state that the main rule is that ships tax the environment relatively little through their normal activities when compared to other forms of transportation per tonne transported and the burden they place on the environment. Lately, the requirements for ballast, noise, fuel and waste has been made stricter. When operating in extreme conditions, these will become more pronounced and may be the prerequisites to receive an operating license. This poses new challenges for both the terminal and the ship design. In long-term cold environments, the current ice-strengthened and ice-travelling vessels will be replaced by an operational ship.

The values of free seafaring

The vision of sustainable development has been adapted in ship-owner operations, too. The environment, health and safety are values that people want to take ensure and that they are willing to pay for. These values are visible in investments, consumption behaviour and legislation. Taking the environmental requirements into consideration too slowly may prevent the ship-owner development for the ship-owner operations. Environmental issues will place strong pressure on services, procedures, etc. Climatic changes and the factors causing them will be emphasised. International co-operation plays a key role in environmental and safety issues.

The point of view of the customer

This particularly crops up during recessions. Ship-owners that are facing losses will usually start reorganising and cutting costs instead of looking for new opportunities. This changes how personnel behave. Employees start being afraid for their own jobs, which leads to them starting to build protective barriers to secure their own position and job. Any energy that would be necessary for searching for new opportunities is wasted on internal competition and to highlight their qualifications and necessity. Procedures are not

questioned and developed; the old methods and procedures are strongly adhered to and costs are cut. The fear of making a mistake paralyses decision-making, the most skilled employees leave and as the leadership cannot present a credible future, the game is over.

Successful ship-owners have at least one common feature, in addition to constant improvement and cost-efficiency. They learn faster than their competitors do. The pace for changes is nowadays so fast that even the fastest learners are too slow in some issues. No one is good at everything. New skill entities and methods must be found and they are best achieved through strategic partnerships.

Matters that must be taken into consideration in seafaring as well:

- The demands of the consumers
- The demands of the services
- Legislation
- The actions of competitors

Ship-owner cost-efficiency can be achieved in the following matters:

- Economy: energy and material normally, even during construction.
- The image of the ship-owner: insurance and financing of chartering
- Values: acquiring and keeping employees

Disadvantages of being the pioneer:

- no knowledge of how the environment changes
- high development costs
- lack of technology
- false evaluations leads to the competitive edge being lost

Management: Security management, including operative environment control and employee development, together with transportation services, form the marketing basis. The elements must be in order when you test to see whether the competitiveness of the environmental elements is worthwhile.

Usability: Ownership alone does not produce big results; it is the manner in which the property is used. One must find out what skills are needed and what skill level should be maintained. The ship-owner's profit is achieved by having common values and a motivated and skilful crew. Winter seamanship must be practiced. The constant change in ice conditions and environment means that practising alone is insufficient; experience must be gained in these matters. Every seafarer must constantly prove his or her skills.

Nowadays, usability is backed by redundancy to secure a disturbance-free and safe journey at sea.

I would like to emphasise that, for the continual well-being of the skilled personnel and for maintaining enthusiasm at work, it is important to pay attention to the balance between work and leisure time, work and family life; the opportunities presented by its flexibility must be exploited.

Networking and multi-skills will multiply the awakening of innovativeness on the ships and in the ship-owners.

Sea routes

Loading areas and terminals are usually built in the vicinity of natural waterways. Modern technology in the satellite age and in other navigation systems enables routes to be marked in ways that are different to how they usually are seen. The difference between sea routes and land routes is that sea routes are one-off investments whereas land routes must be changed and maintained due to habitation and changes in traffic volumes. The sea, a natural shipping lane, enables transportation to go anywhere; oil, global merchandise, naturally uses this for its own benefit. The EU is working on moving transports from land to sea and to ease the jammed land and railway transportations. Usually, the areas that have oil terminal operations will give rise to other general cargo traffic. Oil routes also enable general cargo transport to these areas and improve local logistic solutions, when necessary.

Pipeline possibility

Russia has many ongoing pipeline projects. The shortest and thus cheapest is the pipeline from the oil fields of Northern Siberia to the shores of the Barents and Kara. A pipeline is also being planned from Western Siberia to the Murmansk area with a capacity of 2,4 million barrels per day. The cost estimate of this pipeline is an astonishing 4,5 billion dollars. Another option is Indiga, which has a cost estimate of 100 million dollars. This port can use Suezmax ships. This port will require help from icebreakers and it is a known fact that as ships become larger, the width of the icebreakers will not be enough. To ensure trouble-free and fast seafaring, more icebreakers are needed. Actually, they should be multipurpose icebreakers that are prepared to handle oil leakages, etc.

Even though pipeline is an expensive solution, it will work fine once long term agreements and a steady volume are available. At the same time, they can be used to circumvent dangerous or heavy-traffic areas and the environmental conditions of the pipeline are steady. The pipeline will not deliver the items to the end-user in full. If the pipeline runs through multiple countries, this will naturally create political pressure in both directions and the citizens' stand on the pipeline's route may strongly affect the cost and route of the pipeline. Naturally, a port will cause the same type of discussion, although it is only concentrated in one location.

Citizens expect that ship-owners will behave like good citizens. If we cannot manage our own affairs and develop them by considering them, other people will start to direct them, which may lead to changes in the basic structure.

New challenges in seafaring require the participation of all parties. A common set of values as well as skilled and committed personnel will create safe and fast oil transportation.

A common future will not be created by answering current needs. The ship-owners of the future will succeed in seafaring since they can create a new future and new requirements to ensure the success of our customers.

The benefits of seafaring will be enhanced in the future as long as we navigate according to the stars and not following the lights of every passing ship.

9. PERSPECTIVES OF THE DEVELOPMENT ARCTIC REGION OIL AND GAS FIELDS

Ivan Shestakov, Joint Stock Company Gazprom

Abstract

JSC GAZPROM» is one of the biggest and oldest gas companies. This presentation describes the principal structure, abilities and priority projects of the company.

The Arctic region and offshore sea-fields are Gazprom's significant interest zone. The company is initiating several projects in the area. The presentation describes the challenges the company has faced in the development of the Arctic region.

Natural gas liquefaction is a new perspective direction of the Gazprom's activity. The challenges related to the new technologies are discussed as well as the problems of the LNG transportation from the Arctic region.

Discussion

At the moment Gazprom is making comparative studies on the production and the transport of LNG from Yamal. The project is advancing. At this point it is clear that big investments will be needed there. The project is balancing to take care of the environmental issues. The pipeline will be taken through the Yamal peninsula. The ground is swampy and the design of the foundation structures is a complicated task. Building of the pipeline will also be much more costly than it was estimated.

Preliminary studies for project Shtokmanovskoye are also being carried out. Mr Shestakov was asked about plans to build a pipeline to Murmansk. He answered that studies are at preliminary stage, and Gazprom is currently comparing several possibilities. The long distance from platform to coast is a challenge with regard to supplies and crew maintenance. These problems are currently being assessed.

Regarding marine transportation of compressed gas Mr Shestakov said that studies have shown that LNG transport is not efficient if distances are short. For the gas of Shtokmanovskoye the problem is that there are no consumers within easy distances.

10. FUTURE PROSPECTS OF LIQUEFIED NATURAL GAS (LNG) TRANSPORTS IN THE NSR

Nikolay Bogachev, Tambeyneftegas

Abstract

During the last five years gas consumption grew by 13%. During the same period of time oil consumption grew by 7%. The oil prices will remain volatile for the next decade. The gas prices are much more predictable and will stay in the range of 5-7 USD/MBTU in the USA.

The oil revenues were intensely explored in the past. No big discoveries can be foreseen. Gas reserves are available and sufficient: in 2004 the world has

- 35 years of oil reserves
- 70 years of gas reserves

The main oil reserves are situated in the countries that restrict foreign access to the reserves (The Middle East). Gas rich countries like Russia and Qatar favour foreign investment in technology intensive developments. Oil reserves are situated in politically troubled areas with no easy solution to their problems in the foreseeable future. The main gas reserves are in the countries friendly to the West and with an acceptable level of stability.



New technologies permit to produce LNG and motor fuels that are much more ecology friendly than oil. The reduction of the cost of gas processing will make gas increasingly welcome as a major fuel in the developed countries.

The growing markets of Asia, especially China, will consume more and more oil. One must remember that still more than ¾ of China's work force use manual labour. Every percent of GDP growth of China will result in big oil consumption.

Russia consumes today 1 ton of oil per person per year. US consumes 5 tons of oil per person per year. American economy is nearly 33 times larger than the Russian one. If Russian economy grows twice in ten years as planned by the Putin Administration the Russia's oil export drop by half in the absence of new oil reserves.

By 2025 the major energy source of the West will be gas (LNG). Oil will remain as the main source of energy to countries that cannot afford huge capital investments in GTL technologies. Hydrogen – the next source of energy will be produced from gas.

Long gone the times when oil could be produced in the state of Pennsylvania.

Most of exploration effort concentrated along the coast of US and Canada gave zero effect. Companies trying to boost reserves by drilling there are getting no value for their money. Exploration will take place where the reserves are probable or possible and not where they are desired.

The division by energy type – market criteria will increasingly take shape in the nearest 20 years. The Middle East oil and gas will more and more go to Asia. Russia, Africa, Latin America will supply US and Europe.

Russia contains 1700 TCF of gas. Russia must become the major recipient of Western capital for LNG and GTL development. That's in the interest of Russia, US and Europe. Russian gas reserves have already been explored. Some very promising prospects are there as well.

Russian Arctic contains more than 90 million tons of conditional fuel (or oil equivalents).

35 billion tons of oil equivalent are confined within the Pechora and Barents Sea.

Proved, probable and possible reserves of gas of the Yamal and Gydanek peninsulas plus off shore zones in close proximity are some 50 billion tons of oil equivalent according to Russian geologists estimates.

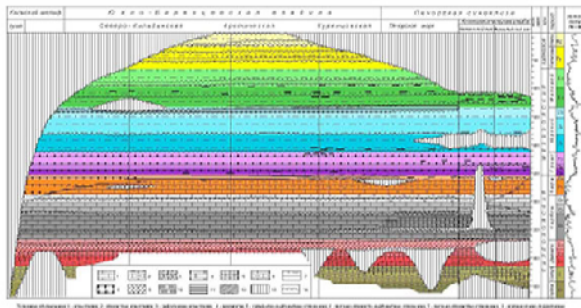


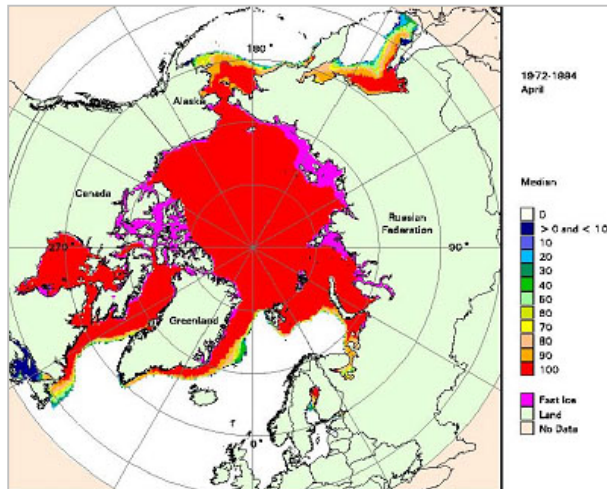
Figure: Formational pattern of the Sedimentary Cover (Barents and Pechora Seas)

Russian Arctic reserves are relatively well explored. For example, more than 355,000 lin. km of 2D seismic, more than 500 sq. km of 3D seismic were done only in the Barents Sea. The average seismic profiling density in the off shore areas is 0.3 km/sq. km. The total drilling footage is 146,400 meters

Transportation of gas by ship after 2000 km is less expensive than by pipe. Cold climate reduces OPEX for liquefaction by 30%. Most of Russian gas reserves are in the North. Distance to the US from Russian North is 4 times shorter than from Qatar.

New technologies permit to go through icy waters at a cost of less than 1\$ / MBTU from Yamal to NE USA.

The reanimation of NSR by starting LNG projects will let cut the shipping distance between Europe and Asia by half. The economy of scale of LNG projects in the Russian North will prove to be very efficient with the build up of maritime infrastructure.



Our company believes that the full-scale development of the Russian Arctic reserves should commence from the Yamal peninsula.

The proved reserves of the Yamal peninsula are more than 20 billion tons of OE. The reserves are well explored. There are 20 discovered fields plus interesting prospects offshore. Gydansk peninsula with substantial unlicensed reserves is close by.

The Yamal peninsula seats exactly in the centre of huge hydrocarbonate reserves of Russian Arctic

There is some infrastructure in Sabetta (Tambeyneftegas) – a residential camp for 1,200 people, a port, an airport, 30,000 tons of storage for condensate, electric power generators etc. Upfront costs are at least 3 times lower as opposed to offshore operations.

The condensate and LPG production precedes gas (LNG) production that reduces up front costs.

Availability of the pipe line system to the South that opens an opportunity to sell gas at the domestic and European markets in future. That provides access to three market places: USA (LNG), Europe (LNG + pipe), Russia (pipe).



Tambeyneftegas is a privately owned Russian company. It has a production license for the South Tambey field that contains 43 TCF of gas, 400 million barrels of recoverable condensate and 200 million barrels of LPG. It is surrounded by fields and geological prospects containing at least 3 times more gas (West Tambey (oil), North Tambey, Tassiyskoye, Malaginskoye, Utrenneye, etc).

Tambeyneftegas has a company camp, Sabetta, situated on the South Tambey field, on the bank of the Ob Bay.

- Facilities include an airport, port, 30,000 tons of condensate storage
- Communication is via satellite telephone to Moscow
- The Field has 54 exploration and appraisal wells
- 3 producing now, 5 – by the end of 2004 (1000 and 1500 b/d correspondingly)

All condensate is shipped to Rotterdam or Finland by ice-strengthened tankers and icebreakers all year round.

RESERVES

- South Tambey field – 1.2 TCM = 43 TCF of gas
- Malo-Yamalskoye field – 0.2 TCM = 7.5 TCF

STATUS

Residential camp for 1,200 people, airport, seaport, condensate storage facility for 30,000 m³, 5 reperferated wells producing 1,500 b/d by December 2004, (3 now).

Condensate production at the first stage. Gas is recycled into Cenomanian. Limited production of condensate (8,000 b/d) until 2008. Pipeline connection to NE Yamal of 100 km. LNG plant; condensate separation plant; a port with a buoy; condensate, LPG and LNG storage; 140,000 tons and 200,000 tons (later) ice-breaking tankers (Kvaerner Masa-Yards design), regas terminal in NE America.

5, 10, 15, 20 mln tons production of LNG in accordingly 2008, 2009, 2015, 2020. Condensate production of 250,000 b/d by 2015 (including production from geological prospects and adjacent fields).

LNG has a far-reaching importance for Russia for several reasons. Actually LNG projects answer some of the most challenging goals set by the Putin Administration.

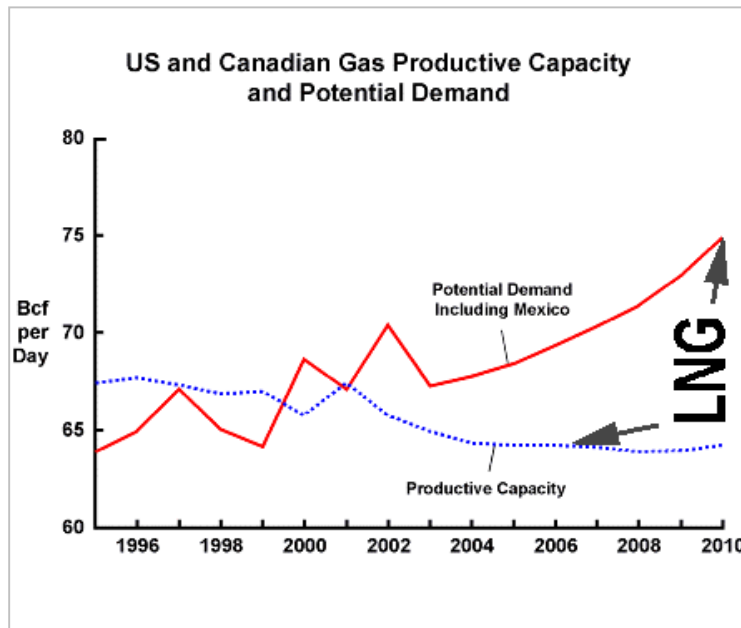
Transfer of Russian economy from solely resource base towards technology oriented projects.

LNG projects require a high level of utilization of modern technologies in production, liquefaction and transportation of gas.

Obviously the first LNG trains and ships must be built outside Russia to save time and to escape possible violations of technological process. At the same time for purely economic reasons the following parts of LNG technological chain may and should be produced in Russia. Tambeyneftegas has already started a research in this direction.

Reanimation of Northern Sea Route.

The constant traffic of icebreakers, LNG ice breaking tankers will clear a much cheaper way for ships of other designations stretching out to Eastern Siberia.



Henry Hub Natural Gas Spot Price Outlook (nominal US dollars per MMBtu)							
	2001	2002	2003	2004	2005	2006	2007
January	8,45	2,29	5,39	6,03	6,57	7,39	7,98
February	5,65	2,27	7	5,41	6,36	6,93	7,52
March	5,15	3	6,37	5,38	6,18	6,14	6,37
April	5,20	3,37	5,27	5,7	5,37	5,72	5,94
May	4,21	3,51	5,77	5,89	5,41	5,76	5,99
June	3,72	3,2	5,8	6,08	5,47	5,83	6,04
July	3,07	2,99	5,04	5,73	5,53	5,87	6,09
August	3,01	3,08	4,96	5,74	5,55	5,9	6,12
September	2,19	4,08	4,65	5,8	6,34	6,36	6,48
October	2,42	4,08	4,65	5,8	6,34	6,36	6,48
November	2,37	4,06	4,45	6,13	6,76	7,29	7,16
December	2,37	4,74	6,12	6,28	7,1	7,69	7,54

For Russian companies (both Gazprom and independents) it is economically advantageous to share parts of the whole infrastructure of LNG supplies.

The competition in the market place will be not between the Russian companies but between LNG from Russia and from other sources. Economics of Russian projects show that because of shorter distance, big reserves and cold climate Russian LNG will be highly competitive in the US and Europe.

Today Russian gas industry breathes through its export pipeline to Europe owned by Gazprom. Short-term pipeline gas monopoly gives advantages to the supplier. Long term with the emerging gas and LNG projects in the Mediterranean it will increasingly make the gas market place of Europe that one of the consumer. LNG will substantially diversify the export destinations of the Russian gas and will make it more competitive even in Europe.

Gazprom has many reasons to restrict access to its pipeline system to independents: some gas fields were illegally withdrawn from Gazprom, Gazprom needs huge investments into the pipeline maintenance and renovation, too much gas in the system can ruin volatile gas markets.

At the same time Gazprom has not been noticed in violating the rights of such independent producers as Tambeyneftegas. Tambeyneftegas possesses licenses that have never belonged to the gas monopoly and is working on the project that will not use the pipeline at least short term.

Russian law permits the privatization of gas reserves. The privatization of the gas industry unlike oil was constrained by the monopoly of Gazprom on the pipe. The come out of LNG projects changes this situation completely.

The build up of a bridge between Europe's biggest gas reserve and the market must become a goal of the international cooperation in the Russian Arctic. Some 400 miles of the route from Yamal to the West lies in icy waters.

Kvaerner Masa-Yards have done an impressive amount of work to promote icy water shipping in the Russian Arctic. KMY has an ownership of ship building plants in Europe

and Russia. New concept of ice breaking and ice-strengthened tankers have been developed. Tambeyneftegas LNG project in Yamal brings a new dimension to the demand of ice breaking and ice-strengthened tankers.

China has announced its intention to create an LNG ship industry at home that represents a competitive challenge not only to the European LNG tankers builders but to the struggle for LNG supplies as well.

Europe and the US must secure their energy supplies by helping to build LNG ice breaking and ice class tankers in Europe to transport Russian LNG.

Tambeyneftegas after the conceptual feasibility study has been accomplished will increase its money raising effort but it may take longer than needed to keep the European ship builders afloat to be able to develop necessary facilities to create a substantial amount of tankers.

The government of EU and Russia must initiate a dialogue to secure means and resources for LNG shipping in the icy waters of the Russian Arctic.

Discussion

Mr Bogachev said that Tambeyneftegas disagrees with Gazprom's calculations on the economical feasibility of pipeline transport of gas. Tambeyneftegas's opinion is that the most efficient way is to transport gas as LNG by ship.

Mr Bogachev also commented that Tambeyneftegas believes that in the future, countries like China and India will be the biggest oil consumers in the world, this being partly due to the fact that they are not prepared to invest in GTL (gas-to-liquids) technologies. He said that China will build its own fleet during the nearest years and will start the shipments from Indonesia. The Chinese ships will transport the oil to China and nowhere else – the western countries should secure their supplies as soon as possible.

11. USE OF THE NSR FOR THROUGH PASSAGE

Loly G. Tsoy and Anatoly N. Yakovlev, Central Marine Research and Design Institute

Abstract

Russia always showed interest in the development of transit traffic on the Northern Sea Route from ports of Europe to ports of the Asian-Pacific region and of the northwestern coast of the USA and Canada.

History of the transit along the NSR has its past, present and future. The possibility was investigated of the through sailing of ships on the NSR not only during summer arctic navigation, but in the year round mode as well. In May-June 1978, an experimental high-latitude transit commercial voyage of icebreaking cargo ship Kapitan Myshevsky escorted by nuclear icebreaker Sibir was organized and successfully carried out with the purpose of determination of the navigational conditions on high-latitude routes during the period of maximum ice growth.

In 1991 the Northern Sea Route was opened for the international shipping. "Rules of the navigation on seaways of the NSR" were published for that.

At present, isolated transit voyages of ships along the NSR are realized. Restraining factors are high insurance rates of the NSR marine risks and lack of the guarantee to deliver cargo in accordance with a rigid schedule. At the same time, the investigations made on the risk assessment of ships navigating the NSR and on the reliability of icebreaker escorting have shown that the probability of the loss of ship in the Arctic is much lower, than in the world ocean and the delivery of cargo within the planned periods of time may be ensured by the construction of more powerful icebreakers and transport ships of new generation.

Preliminary calculations show that transit through the NSR may be economically more profitable than following the traditional waterway via the Suez Canal.

Discussion

Mr Joachim Schwartz from German Association for Marine Technologies said that according to his own research, Mr Tsoy's evaluation of the economy and profitability of the transit voyage is too optimistic. Mr Schwartz said that he has calculated a similar case, and found out that the costs will be much higher.

12. USE OF THE NSR - VIEWS OF THE GERMAN SHIPPING INDUSTRY

Joachim Schwarz, German Association for Marine Technologies

Abstract

German Association for Marine Technologies deals with the following topics

- Offshore Technology Oil/Gas
- Offshore Windenergy
- Hydrography
- Marine Environmental Protection
- Underwater Technology
- Polar Technology
- Coastal Zone Management
- Maritime Safety and Security
- Aquaculture

Germany's interest in the development of Arctic Technology concentrates on

- Arctic Shipping
- Shipbuilding
- Pipelines
- Subsea Production of Hydrocarbons
- Offshore Structures

The German Ministry for Research has in the past and will also in the new Research Program 2005-2008 support Arctic Technology Research. The German industry appreciates the formation of the Noncommercial Partnership of the Coordination of Northern Sea Route Usages.

GMT will promote the use of the NSR to the German industry. For this purpose we will organize a Special Working Group NSR in order

- to inform more industry about commercial chances
- to learn and help solving problems
- to provide a communication link to the Russian Noncommercial Partnership of the Coordination of Northern Sea Route Usages

The promotion of the NSR usage will be based on the climate change and its consequence of reduced ice thicknesses in the Arctic. In order to convince the western shipping industry about the business chances in using the NSR the following actions must be taken:

Regulations more customer friendly and reliable infrastructure be established:

- Communication system be organized under one umbrella for the entire NSR length
- Ice Route Optimisation be developed, tested and implemented
- icebreaker fee be calculated on the basis of 100% occupation
- Insurance fees considering thinner ice, optimized route and advanced ice reconnaissance

After the improvements are being established Russia/EU should support commercial NSR-voyages for the demonstration of the advantages, perhaps by using an ice-strengthened Container Feedership. Beneficial for the NSR-transit usage would be, if the transport of oil from the Russian Arctic would soon lead the way.

13. NON-COMMERCIAL PARTNERSHIP OF THE COORDINATION OF NORTHERN SEA ROUTE USAGES

Vladimir Michailichenko

Abstract

The presentation “Non-commercial Partnership of the Coordination of Northern Sea Route Usages” by captain Mikhailichenko gives the outline of Partnership foundation history, describes its main goals and objectives, the most important of them being development of the draft of the Federal Law of the Russian Federation “About Northern Sea Route”. The presentation also dwells upon the structure of Partnership and briefly characterizes the some of the member organizations. The presentation as well gives the information on how legal bodies can become Partnership members. Another aspect of the presentation is statistical information in the form of tables about Northern Sea Route, namely:

- Annual Traffic on the NSR 1933-2003 (thousand tons)
- Main Characteristics of Arctic Shipping during the Period of 1985-2003 (total amount of cargo, number of ships, number of voyages)
- Cargo Turnover of Arctic Ports (thousand tons) – name of ports, the year in maximum as compared with 2003
- Annual Transit Traffic along NSR 1991-1997 and main types of cargo
- Preliminary Assessment of Marine arctic Cargo Shipment for the Period up to 2015 as Estimated by Russian Research Institutes

14. CONCLUSIONS AND RECOMMENDATIONS

The benefits of marine transportation

The benefits of marine transportation are achieved by a number of actions. The client's interests are kept in mind. The objective is to lower the production and transportation costs. The economics of scale are often considered to be the key to success. When starting new operations, the pioneer faces additional challenges, such as development costs and lack of technology and infrastructure on site.

The environmental aspects also play a great role. In remote arctic areas the challenges of developing the economic efficiency are great. Insurance costs depend on many factors, most importantly on the vessel's applicability to the chosen task and the available supporting infrastructure.

Thus the efficiency of terminals and loading facilities are an important factor for a shipping company. Costs can be cut by deciding the locations for terminals and loading facilities correctly, to be able to receive as big cargo vessels as possible and to reduce the costs deriving from transporting the oil or the LNG from the production site.

The benefit of marine transportation compared to other means of transportation is its flexibility. Compared to pipeline construction, the infrastructure needed for marine transportation costs only a fraction on the pipeline costs. Pipelines do not adapt to changes without costly reconstruction.

Recommendations

ARCOP should transfer the mentioned qualitative benefits into quantitative economic factors.

Transit traffic by the NSR

Along with the Trans-Siberian railway, the Northern Sea Route is the second most important latitudinal transportation route in Russia. Due to high insurance costs and schedule problems, the shipments along the route have decreased during past years. Insurance costs are high regardless of the fact, that according to the accident statistics the route is very safe.

CNIIMF expects that the transit traffic will grow during the nearest years. To improve speed of transport and to ensure the delivery of cargoes within planned schedules, CNIIMF suggests investments to renew the icebreaking fleet and the cargo vessels.

Recommendations

ARCOP should comment the use of NSR as a potential Euro-Asian transport corridor, and how the findings of ARCOP will support this development.

Service Transportations to Population Centres in the Russian Arctic

Since the collapse of the USSR, the volume of cargo of the service transportations by the NSR, the Northern Delivery program, have decreased to cover only 10% of the total service cargo transportation. The river shipments and railways have replaced the sea transportation. The deliveries include liquid and solid fuel and mass deliveries of food and other goods (flour, timber, cement), which can only be done by water transport.

The representative of Sakha said, that the maintenance of the waterways should be secured by the state. In Sakha, the condition of the riverbeds and river mouths is deteriorating, causing floods and other environmental problems. The Republic of Sakha has hopes to develop the services of the Lena Shipping Company, but the interests of Sakha and the Russian federation do not meet, which hinders the decision making process.

Recommendations

Although the ARCOP scenario covers only the western part of the NSR, the findings should be extended to cover all the NSR, when applicable.

Future prospects of LNG transports by the NSR

The consumption of gas is growing in the world and the market prices are predicted to stay in the range of 5-7 USD/MBTU. Today the world has gas reserves for 70 years. The biggest gas reserves are situated in Russia and other areas that are politically stable.

The GTL technologies are costly, which restrains investments in developing countries. According to Mr. Bogachev presentation, by year 2025 the major energy source of the industrial countries will be gas (LNG) and oil will remain as the main energy source in the developing countries.

It is estimated, 35 billion tons OE are confined within the Pechora and Barents Sea. Yamal and Gydanok peninsulas along with offshore fields contain 50 billion tons OE. Tambeyneftegas's LNG transportation scenario includes the use of the NSR. Tambeyneftegas estimates, that by 2010 the company will produce 10 million tons of LNG and transport it by the NSR from the port of Sabetta.

When LNG transportations are considered, the most important aspect is securing the constant flow of transportation. To achieve this, Tambeyneftegas will invest in ice-going LNG tankers that are able to operate without icebreaker assistance.

Gazprom has traditionally favoured pipeline transportation and building large transportation networks. Shtokmanovskoye has made the sea transportation of gas as LNG a topical issue, since the most potential market is considered to be the USA.

Regarding Yamal gas, both pipeline and sea transport is possible. The final decision has not been made. Gazprom is making comparative calculations on the economics of transportation.

Recommendations

In the final conclusions ARCOP should also discuss the problems related to LNG transportation. ARCOP should take into account the outcome of Gazprom's studies regarding Yamal gas transportation.

Other tasks for the icebreaker fleet

The polar station projects have an important role in monitoring the changes in the environmental conditions of the arctic regions. One of the tasks of the federal icebreaking fleet is to support these activities.

Recommendations

When making recommendation on how to resolve the challenges related to availability of icebreaking services, ARCOP should take into account also this type of tasks for the federal icebreaking fleet.

The ARCOP scenario should include also time schedule for constructing all the elements of the transportation system.

The development of NSR infrastructure

6 nuclear icebreakers, 4 diesel linear icebreakers and 2 supply icebreakers provide icebreaker assistance on the NSR. It is expected, that the large arctic oil and gas projects will support the development of the route and its infrastructure. Murmansk Shipping Company MSCO is currently working to prolong the service life of the nuclear icebreakers. The lack of icebreaker assistance along the NSR is looming regardless of these actions, since they are only a temporary solution. The fate of the icebreaking fleet remains in the hands of the state. The Russian Federation has presented construction plans of only two icebreaking vessels to renew the fleet. One vessel is currently under construction and another one is in the design phase.

Rosneft and FEMCO are planning major transport infrastructure investments to secure the transport of the crude from Rosneft's fields in the north. The volumes of crude that are to be transported via terminals in Archangelsk, Dikson and Murmansk require a full fleet of shuttle tankers, icebreakers and assisting vessels. FEMCO plans to build several shuttle tankers, but has no plans to build escorting icebreakers. Mr Aprelenko raised the question of icebreaker shortage and said that FEMCO will require a guarantee from the state regarding the icebreaker assistance.

FEMCO's project to develop marine transport infrastructure is quite considerable. It was seen as a very positive development by many of the workshop participants. The existing infrastructure is insufficient. Rosneft has long-term development plans and is ready to expand its fleet. Many of the other companies operating in the area have also decided to do so.

Recommendations

ARCOP should produce more specific information on:

- economic feasibility with increasing transportation volumes
- transportation costs with use of different technologies including icebreaking
- cost of environmental protection with increased volumes of oil transportation
- cost of supporting infrastructure needed to handle increased traffic density on the NSR

The ARCOP scenario should include also time schedule for constructing all the elements of the transportation system.

NSR fee system development

Norilsk Nickel, today the most important employer of the northern icebreaker fleet, is investing in ice-going vessels to reduce the dependence of its export system on the state-owned icebreaking service. The company hopes for reductions in the icebreaker fees after the first ice-going vessel has proved its performance in 2006.

Murmansk Shipping Company MSCO's funding – and thus the maintenance of the nuclear icebreaking fleet - depends on the NSR icebreaker fee policy. MSCO warns that cutting the fees would endanger the financing of the fleet. The current financing system does not allow lowering the icebreaking fees even if the future development of the route would strongly depend on it.

If new users were to be encouraged to start operations, the financial base of the icebreaking fleet should be stabilised by using some other funding. The shipping industry is hoping that the Russian government would widen the financial basis of the fleet, to allow the renewal of the fleet without a need to raise the fees considerably.

The experts concluded, that the fairway dues, and thus the economics of the transportation, are the deciding factor for the revival of the NSR. More cargo is needed to finance the infrastructure, but potential users hesitate because of the high level of the fees.

Recommendations

ARCOP should provide ideas with comparative calculations of different ways to collect the fees to cover the costs of icebreakers and other supporting infrastructure needed for safe and efficient navigation on the NSR. These ideas should take into account the different transportation needs and the different technologies to be used.

It is recommended that ARCOP include in its work a comparison of ways to organise and finance icebreaker services:

- federal icebreaker services
- commercial icebreaker services
- services specific for each oil or gas field development.