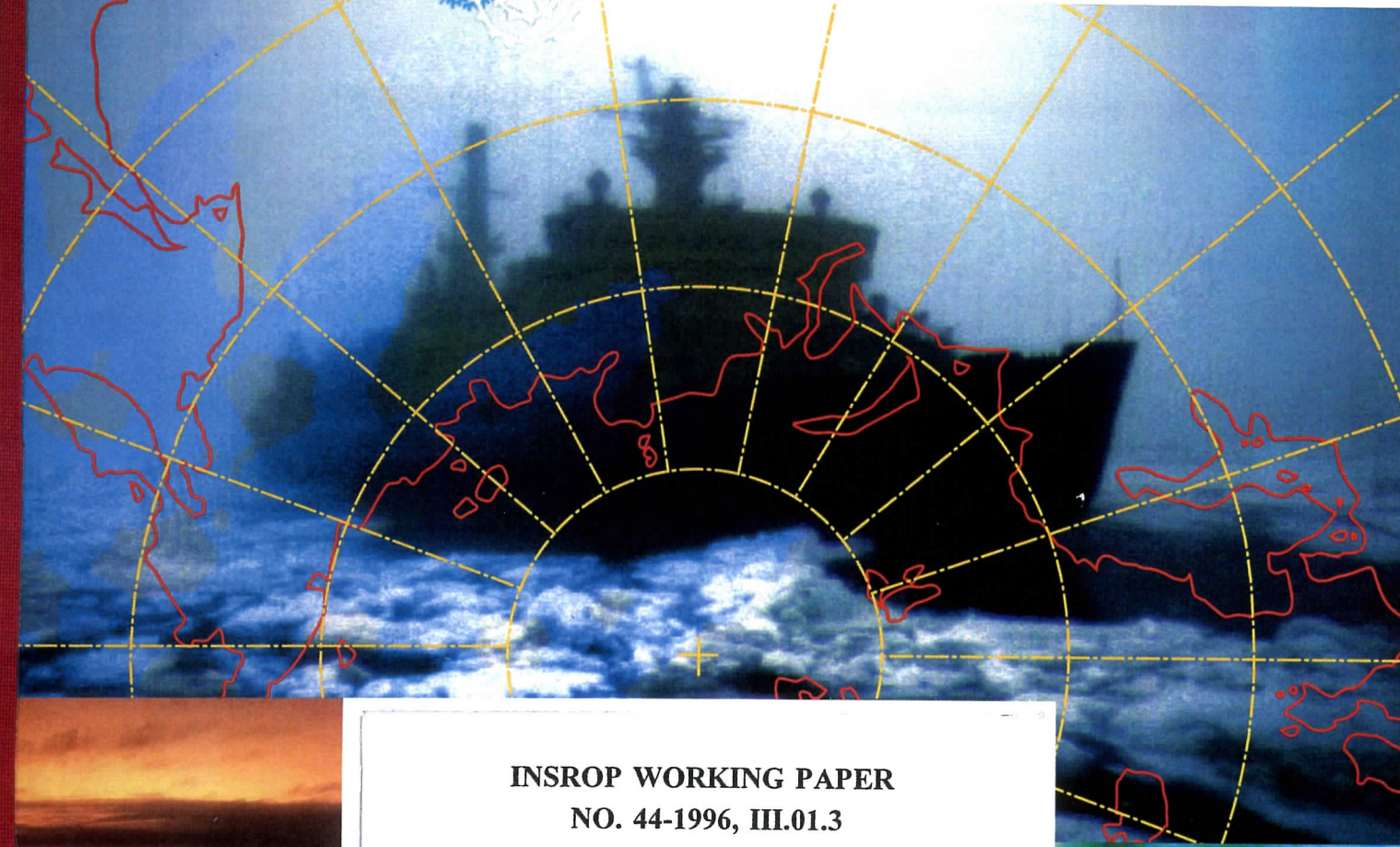
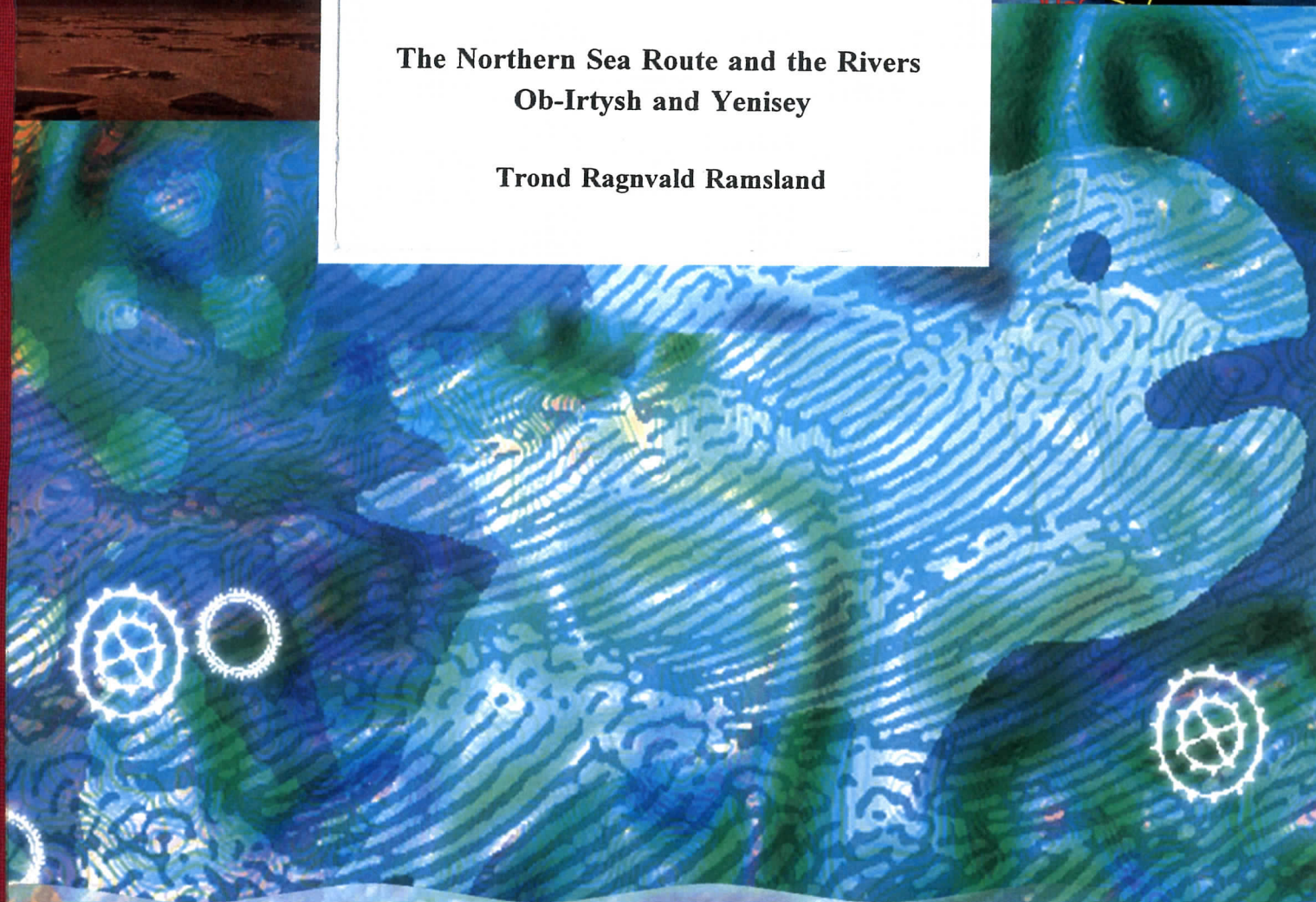


INSROP WORKING PAPER
NO. 44-1996, III.01.3

The Northern Sea Route and the Rivers Ob-Irtysh and Yenisey

Trond Ragnvald Ramsland



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International Northern Sea Route Programme (INSROP)

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Sub-programme III: Trade and Commercial Shipping Aspects

Project 01.3: Development of Oil and Gas Exports in Northern Russia

Title: The Northern Sea Route and the Rivers Ob-Irtysh & Yenisey

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FOREWORD - INSROP WORKING PAPER

INSROP is a five-year multidisciplinary and multilateral research programme, the main phase of which commenced in June 1993. The three principal cooperating partners are **Central Marine Research & Design Institute (CNIIMF)**, St. Petersburg, Russia; **Ship and Ocean Foundation (SOF)**, Tokyo, Japan; and **Fridtjof Nansen Institute (FNI)**, Lysaker, Norway. The INSROP Secretariat is shared between CNIIMF and FNI and is located at FNI.

INSROP is split into four main projects: 1) Natural Conditions and Ice Navigation; 2) Environmental Factors; 3) Trade and Commercial Shipping Aspects of the NSR; and 4) Political, Legal and Strategic Factors. The aim of INSROP is to build up a knowledge base adequate to provide a foundation for long-term planning and decision-making by state agencies as well as private companies etc., for purposes of promoting rational decisionmaking concerning the use of the Northern Sea Route for transit and regional development.

INSROP is a direct result of the normalization of the international situation and the Murmansk initiatives of the former Soviet Union in 1987, when the readiness of the USSR to open the NSR for international shipping was officially declared. The Murmansk Initiatives enabled the continuation, expansion and intensification of traditional collaboration between the states in the Arctic, including safety and efficincy of shipping. Russia, beeing the successor state to the USSR, supports the Murmansk Initiatives. The initiatives stimulated contact and cooperation between CNIIMF and FNI in 1988 and resulted in a pilot study of the NSR in 1991. In 1992 SOF entered INSROP as a third partner on an equal basis with CNIIMF and FNI.

The complete series of publications may be obtained from the Fridtjof Nansen Institute.

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INSROP

SUB - PROGRAMME III

Project III.1.3

THE NSR AND THE RIVERS OB - IRTYSH & YENISEY

A Preliminary Study of Cargo Volumes, Infrastructure & Freight Rates

Prepared by

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1. INTRODUCTION

1.1 AIM OF STUDY.

The aim of the research tour to Northwest Russia & Siberia was to facilitate a correct picture of the current state of production and transportation of raw materials and semi-finished goods. The key idea was whether or not these commodities can be exported through the northern ports at competitive rates, and if so, how that could affect the Northern Sea Route.
Central to undertaking this journey was the lack of available and relevant data from both Russian and Western sources. To build up a realistic picture of the potential trade via the Northern Sea Route it was necessary to compile and analyse raw data by ourselves.

1.2 FOCUS OF THE STUDY.

The first priority was to verify the current state of the infrastructure. Due to a history of large transportation volumes, one could expect that a reasonable infrastructure in terms of port handling equipment, vessels and or tugs/barges were in place. Thereafter focus was on commodities which in terms of geography are produced near to the rivers Ob and Yenisey, and thus could be exported by means of the above-mentioned infrastructure. Thirdly, it was necessary to evaluate the logistics costwise versus exports through the Baltic as transport rates are a key to successful development of the natural resources.
The lack of Russian port capacity in the Baltic and the high tariffs in the Baltic states, could open an alternative market for international shipping, through export of commodities via the northern ports.

1.3 LIMITATIONS OF THE STUDY.

Both cost and time wise the study was limited. Consequently it was necessary to compromise between the need to survey each production area in a thorough manner and to obtain the necessary geographical coverage, a reasonably wide geographical coverage being necessary to aggregate total volumes. Non-existent information on schedules and prices of

2. THE NORTHERN RAILWAY AXIS.

2.1 Introduction.

The northern railway is the north-western logistic artery connecting the Northern Ob-basin and the Yamal Peninsula to Moscow and Western Russia. It also interlinks Arkhangel Oblast and the port of Arkhangel through the western part of the northern railway which runs through Vologda and Plesetsk.

The most relevant area with regard to the northern ports was the Komi Republic. The main industries were forest products with centre in Syktyvkar, Uktha with its refinery and the headquarters of Severgazprom, the gas major which also operates the gas condensate plant in nearby Sosnogorsk, Pechora with its inland fisheries and Vorkuta as a major coal producing region. When deciding on which areas to visit, we focused on Uktha and Vorkuta as being the major industrial centres.

2.2 Uktha Refinery.

2.2.1 Logistic Situation.

In Uktha the major oil refinery in the Republic Komi is located. The second refinery in Komi at Usinsk is located on a side-track off the Northern railway north of Uktha. The geographic location at Uktha is ideal in terms of proximity to the oil production areas in the northern Komi and Timan Pechora region. However, for the refined products the distance to both the domestic and export markets is a major problem due to long haulage and its associated costs. Exportwise crossborder tariffs and the number of transport modes and storage involved are major costdriving factors.

2.2.2 Financial Situation.

The main financial problem for the refinery is the increased railway tariffs. Railway tariffs for export shipments through St. Petersburg or the Baltic States were stated to be at US $ 22-24 per metric tonnes, which is six times the 1992 level. Rate increases officially apply uniformly throughout the industry, but shipments within the administrative area of the

Secondly, the effective crude oil price is lower, due to a preference among independent producers to deliver to close refineries, as losses during pipeline transport then are limited. The normal loss portion during pipeline transport was stated to be between five and fifteen percent. The split between condensation, spillage, leakage etc. was not specified. The reports after the Usinsk disaster in 1995 confirms this picture.

2.2.3 Current Export Volumes.

The refinery exports 600.000 tons of light products (including diesel) and 300.000 tons of dark products (mainly residual fuel oil), which is roughly seventeen percent of total production[3]. The products are mainly exported through Baltic ports , whereas some goes through Novorossiysk and Odessa.

Subject to railway tariffs being negotiated on a pro rata tonneskilometre basis, railway tariffs from Uktha to Labytnangi should be about eight dollars per tonne (the distance to Labytnangi is roughly a third of the distance to the Baltic Ports). When border tariffs plus storage in the Baltic ports amounts to twenty-four dollar[4] per tonne, storage in Arkhangel to eight dollars per tonnes[5] and Murmansk ten dollars per tonnes[6], what at first hand seems as an extreme export solution, may be a feasible option.

Other factors like control of wagons on the single railway, and falling density on the railroad due to low volumes from Vorkuta also favour this solution. However, the line between Seyda and Harp north of the Urals is in bad condition, which may limit the number of trains to Labytnangi.

2.2.4 Preliminary Conclusion.

The refineries situation vs. upstream producers, pipeline operator Transneft and the regional market is good. Although debt collection is a problem, being in a seller's position at the regional market, with long haulage for competing refineries, the profit margin for the refinery is high enough to compensate for outstanding debt vs. its own debt to producers.

---

[3] As note 2

[4] Interview with Vice Precident, Uktha Refinery

[5] General Director, Neftebas Arkhangel

[6] General Manager, Andrei Kopytov, Murman Oil

2.3.2 Financial Situation.

As the figure above indicates, output of coal has been reduced by more than fifty percent over the last seven years. Additional to falling demand, the problems of debt collection, increased railway tariffs and border tariffs in the Baltic are very much present as for the refinery in Uktha. Debtors in the FSU owe the company Rbl 107.000.000.000.- ($ 51.000.000).

As a result, the company workforce had not been paid for the last four months as of July 94, and massive unrest was predicted[7]. Unpaid wages amounted to Rbl 91.000.000.000.- ($ 38.000.000), which is a substantial amount by any standard. Having been the industrial storm troopers of the past, the miners have been, and still are, well paid (when paid). Average miner wage is Rbl 12.000.000/Year, which corresponds to $ 5.800. The high pay also reflects the harsh climatic conditions above the Arctic Circle.

The Chief of Foreign Relations[8] indicated that seven out of twelve shafts would be closed during 1995, and of the seventeen thousand miners and a total of fifty-one thousand employees fifty to sixty percent would have to go.

2.3.3 Export Volumes.

Current export volumes stand at eight hundred thousand tonnes. Currently two contracts, one with Rautarukki, the Finnish industrial company and one Polish are in force, both delivered by rail (which therefore avoid the Baltic border/port tariffs). No exact figures were given, but were stated to be about 350.000 in total. Additionally 450.000 tonnes were expected to move through the Baltic ports.

2.3.4 Preliminary Conclusion.

The fall in domestic demand from the military industrial complex, the domestic debt collection problem and high transportation and export tariffs all contribute negatively. Coal from the Vorkuta Ogul to Europe is affected more adversely than oil products by the increases on railway and border/port tariffs. Being a low value commodity, coal has limited potential to bear increased tariffs. The lack of a predictable cost development with regard to tariff, makes it difficult to reach long-term supply agreements which many buyers seek.

[7] This happened, and repeated itself in January 1996, when a nation - wide coal strike took place in Russia on the same issues.

[8] Alexey I Dunin, Chief Foreign Relations, Vorkuta Ogul

3. THE RIVER OB-IRTYSH.

3.1 Ports of the River.

3.1.1 Labytnangi.

Labytnangi was constructed to serve as a transit port and connect the river traffic with the northern railroad. The town also serves as an administrative centre for the prison towns to the west, Obskaya and Harp. These towns lie on the north eastern part of the Ural mountains 15 and 40 km to the west of Labytnangi . The logic behind the prison town, whose population was quoted to be approximately a hundred thousands[9], is to produce concrete building materials for the railway to Harasavei. Easy access to rocks and its proximity to Yamal being obvious factors logistics-wise. At the time of the visit in July the activity in Harp was high, whereas in Obskaya most of the population was on the Yamal peninsula working on the railway[10]. The local population in Labytnangi stated that it was at least three years till the railway was finished.

The dry cargo port of Labytnangi is in a very good condition, but almost no activity could be identified. The port has a double track railway for at least a kilometre of which 500m directly on the quayside. The gantry cranes, 21 former East German Takraf cranes in total, were in good condition. Currently only small volumes of coal, sand, steel, sawn timber and concrete constructions move over the port. Draught at the port is three meters. As of now, it is obvious that the port facilities will not be the limiting factor with regard to export quantities[11].

3.1.2 Salekhard.

On the eastern side across from Labytnangi, lies Salekhard the regional capital of Yamal Nenets Autonomous Okrug. The connection between the towns is tug-barge which moves at

[9] Estimation by the local population in Labytnangi. Pictures and available documentation at SNF /FNI confirms the existence of the prison camps.

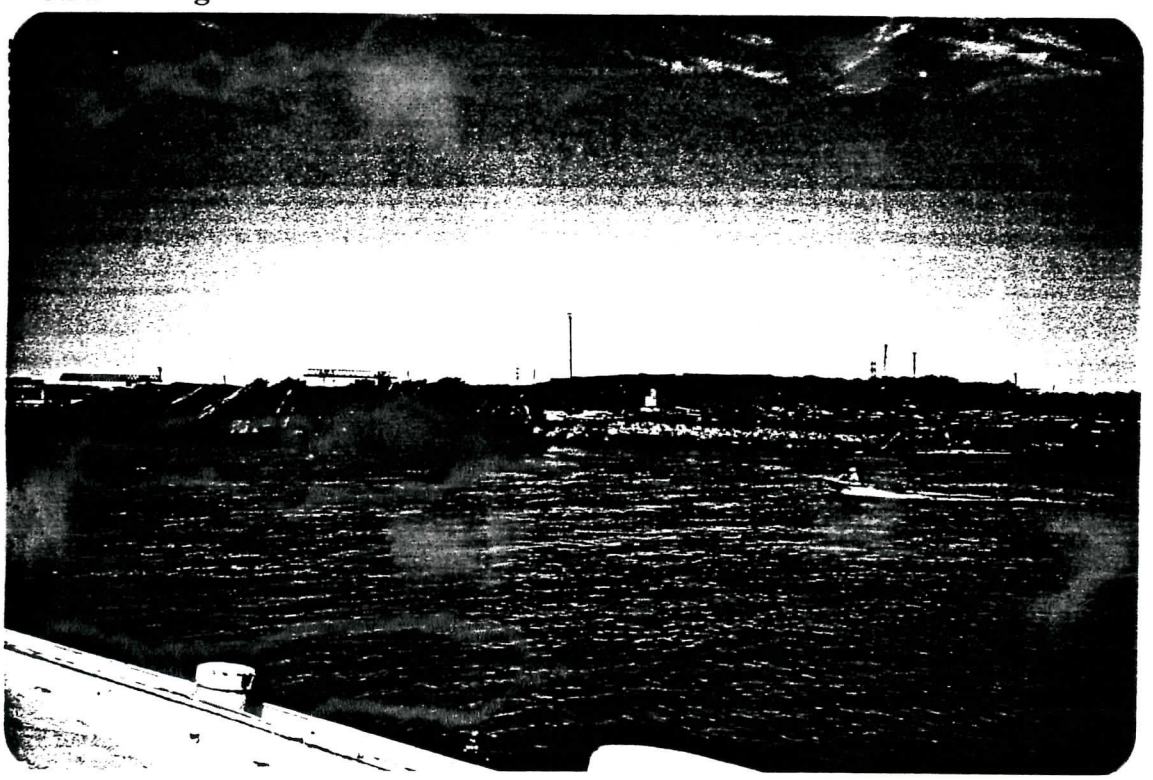
[10] As of 30 november 1995, Gazprom asked for a seven years delay on the development of the Bovanenkovskoye and Kharasaveyskoye gas fields on the Yamal. The work on the railway must be assumed to receive less focus after this postponement plea. See also *Nefte Compass 30 November 1995* and *INSROP Annual report 1995*, comments to sub-programme III.

[11] See Reviewer comments. The constraints for use of the port are accessible river tonnage and suitable trans-shipments points in the Ob - bay area, for example Novvy Port. As the river threshold is only 2,5 - 3 meters deep in the inner Ob - bay, cargoes must be handled twice ; first loading in Labytnangi port complex, secondly transfer to deep sea tonnage. The tonnage draught is likely to be 7,5 or more to achieve economies of scale.

could be seen long range surveillance radars. In terms of regular ground troops, a battalion is stationed at Harp and two companies in Labytnangi. In Labytnangi numerous satellite communication and ground relay dishes were in place.

In terms of foreign activity, only Wartsila Diesel of Wasa-Finland had a presence in the area. They have installed a diesel power station to supply the town of Salekhard with electricity, as the local gas-driven power generation plant was too unreliable to operate. It may serve as the ultimate paradox that in the most gas rich region in the world, a foreign diesel driven plant is installed to serve the regional administration's need.

3.1.3 Sergino.



Picture 3 : Parts of stockpiled timber in the dry cargo port of Sergino on its way into the Ob - Irtysh .

The port of Sergino is a dry cargo port like Labytnangi, and also connected with railway to the Trains-Siberian Railway. It is situated midway between Labytnangi and Khanty Mansiysk on the western bank of the western Ob (The Ob is split into two to three main channels). The port facility consists of three parallel railway tracks with lumber/logs cranes running along

to establish an activity in the area. In all other respects the area show signs of disintegration. This is noted by the reviewer himself and also confirmed in INSROP Paper III.1.1 by Academician A. Granberg. See also note 10.

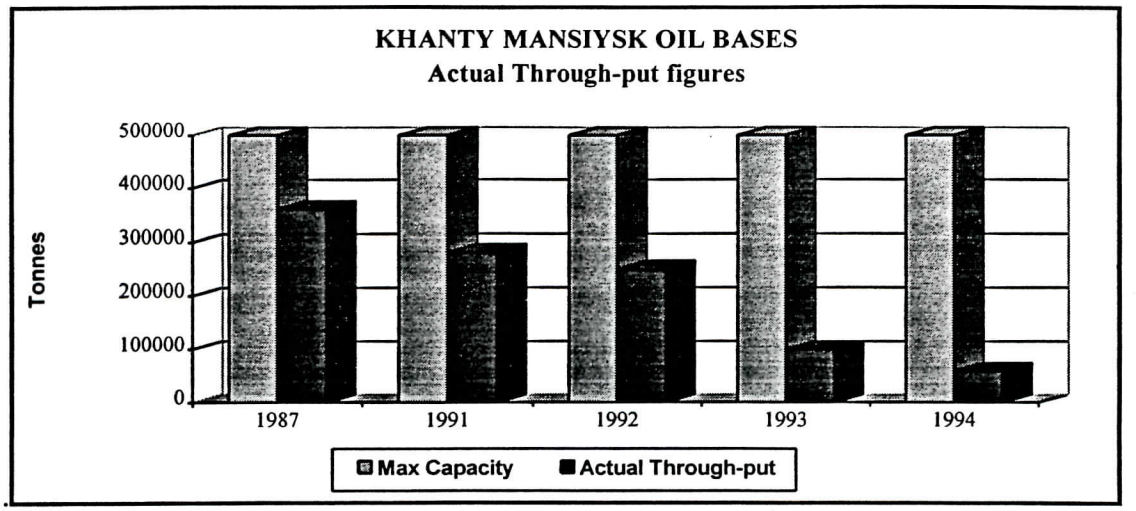


Figure 3

3.1.6 Omsk.

The port of Omsk is one of the most developed on the Ob-Irtysh river system. The port is split in two, the coal terminal and the dry cargo port. The coal terminal has an approximately five hundred metres seafront, with double railtracks and 10 Takraf cranes. The terminal was active at the time of our visit. The dry cargo terminal has 22 Takraf cranes on an approximately fifteen hundred meter seafront, all in working order, with double railtracks. The cargo handled was mostly sand, with some logs and sawn timber. Turnover figures were not available. In addition, the refinery at Omsk supplies the whole Khanty Mansiysk A.O with oil products. The Irtysh River Shipping Company is located in Omsk.

3.1.7 Other Ports.

Other major ports are Novosibirsk, Tomsk, Nizhnevartovsk and Surgut on the Ob, and Tobolsk on the Irtysh. To get a full picture of the river system these ports should be visited.

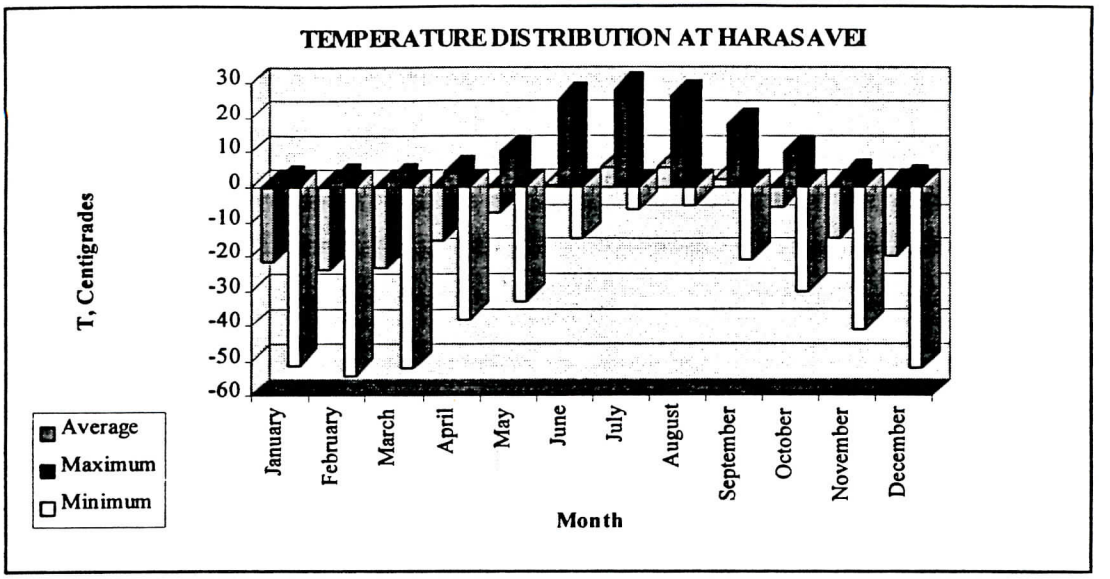


Figure 4

As a consequence the period mid-May to mid-July can be used to shift cargoes northwards for intermediate storage if necessary.

3.3 Depth Limitations.

Table 1

PORT	DEPTH[16]
Obskaya Guba Northern Entry	*11 m*
Tambov Bay	*8-10 m*
Mys Kamenny	*7,5 m*
Novvy Port	*7 m*
Ob-Irtysh River Mouth	*2,8-3 m*
Salekhard-La Pitnangi	*3 m*
Sergino	*3 m*
Khanty Mansiysk	*3 m*
Nizhnevartovsk	*3 m*
Tobolsk	*2,8 m*
Omsk	*2,6 m*

The constraint in depth is the river estuary north-east of Salekhard/La Pitnangi with a depth of three metres. At Novvy Port and Mys Kamenny in the Obskaya Guba the depth increases to between seven and eight metres and ten metres north of Tambov Bay[17]. As the depth in the

[16] Fleet Manager, Irtysh River Shipping Company

[17] See INSROP Paper I.07.2, *Requirements for Ice Performance of Large Ships with Shallow Draft*, by Loly Tsoy CNIIMF and operational work by Arctic Shipping Services/Nemarc on condensates shipments from Ob-bay.

It was difficult to pinpoint the originating ports with corresponding volumes for dry cargo, besides those mentioned above. However, a large portion of the barge fleet works with barge cranes in the late fall - early summer to clear the river for logs. Large quantities of logs are brought into the river by erosion at the spring flood when the ice goes. As can be seen by the enclosed pictures there are clearly more logs available than what the regional needs and sawmills manage to absorb.

The oil products supply along the Ob-Irtysh river mainly originates at the Omsk refinery. In terms of storage capacities along the Ob-Irtysh river there are eight major tank facilities as shown in the table below. In terms of capacities and amounts of each product type no figures were obtained. The river fleet transported 700.000 cubic meters of oil product in 1993 as indicated in the figure above. All these products were for internal consumption. However, as mentioned earlier, and as can be seen below, the Salekhard tank farm is the second largest and most northerly located on the river. Its high capacity opens possibilities for export through the Obskaya Guba, subject to its condition.

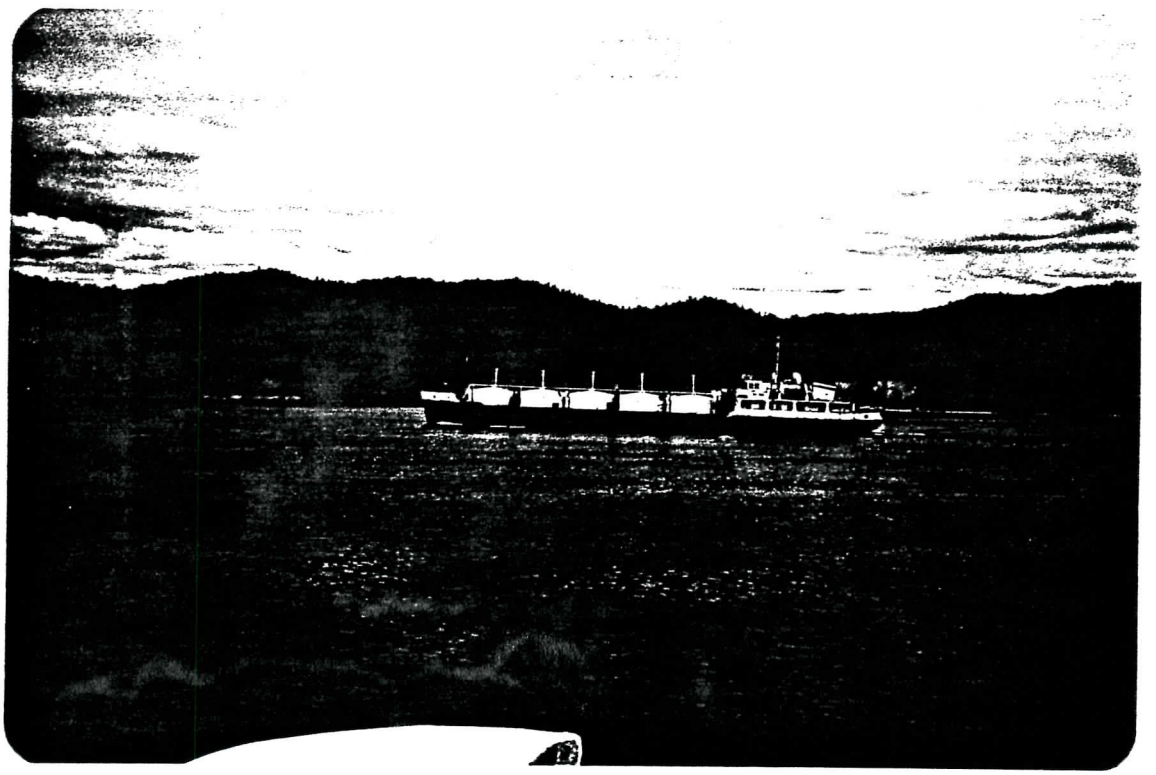
Table 2.

OIL PRODUCT BASES	CAPACITIES (CUBIC METRES)[19]
Salekhard	*120.000*
Sovjetsk	*10.000*
Oktjabrskaja	*10.000*
Khanty Mansiysk	*80.000*
Nefteyugansk	*50.000*
Surgut	*180.000*
Megionskaja	*10.000*
Nizhnevartovsk	*40.000*

3.5 The River Fleet.

The river fleet was beforehand assumed to be split along regional lines, an assumption which was verified. The navigable part of the river Ob-Irtysh runs mainly through three Oblasts, or regions, Tuymen, Omsk and Tomsk (see map) and through two Autonomous Okrugs, Khanty Mansiysk and Yamal Nenets which are part of Tyumen Oblast.

[19] Vice President, Khanty Mansiysk River Shipping Company



Picture 5 : Oil Product Tanker, 2 600 cubic metre capacity, on the Ob. identical vessels operate on the Yenisey.

The vice-president estimated the idle fleet to be fifty percent of the total fleet. The idle fleet presents a problem for the company, not due to the cost of the capital as the vessels were taken over cost free, and nor the maintenance costs which are low due to the low activity and freshwater operation. The main worry for the company is the Federal tax on assets. The idle fleet significantly reduces profits by its very existence.

Appendix 1 sets out the cost of operation of a 600 KW tug and a 3000 dwt barge[20], and the profit estimation which is set at thirty-five percent on top of the operating cost. Appendix 2 estimates total revenue and profit for the fifty percent active fleet, and federal tax[21] on the fifty percent idle fleet. As can be seen, federal tax on the idle fleet reduces profits by 20,54 percent. The vice-Precident was positively inclined towards selling off assets.

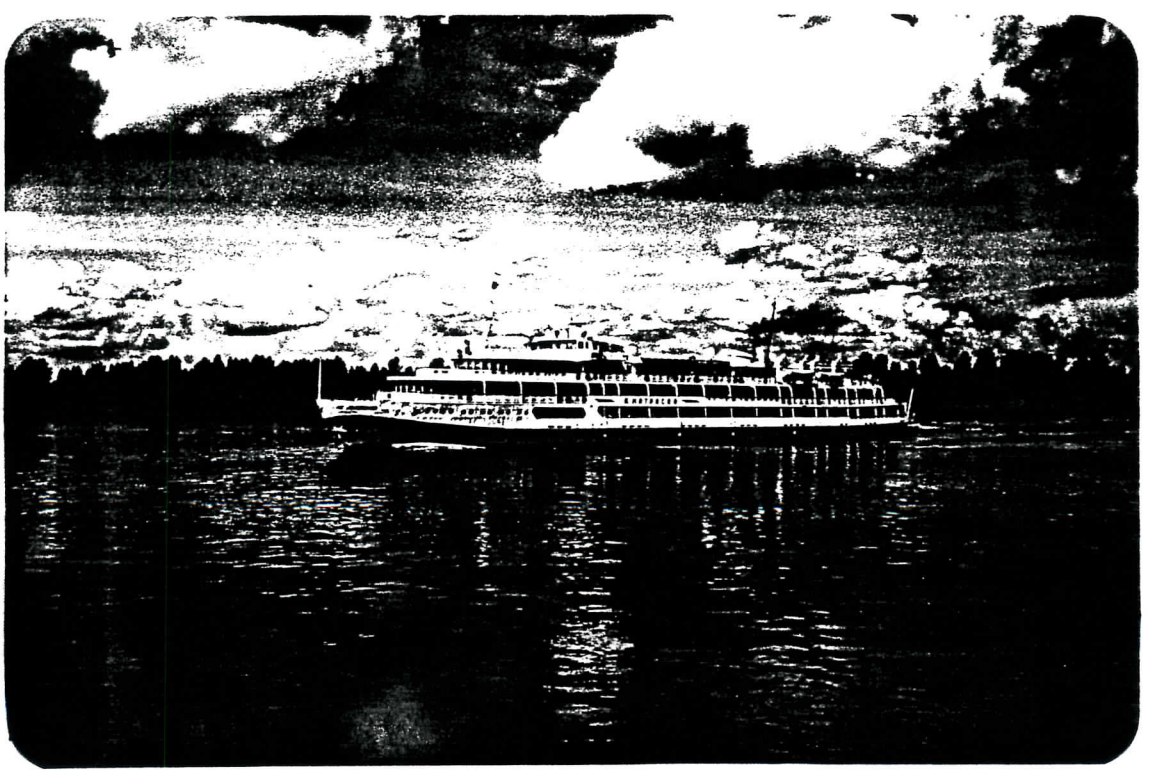
---

[20] See reviewers comments. Figures released by Vice-President Petelin of the Ob-Irtysh River Shipping Company. Later calculations are based on these figures. There is no reason to doubt the costing of the assets. Likewise all tug - barge equipment on the rivers are of identical design, and only marginal cost differences should occur. Supply being abundant, it is only a drastic increase in demand that should alter the picture. As can be observed in the appendix, costing of tug - barge services is on a near marginal cost basis. The figures were later confirmed by Boris A Dyomin, Head of Cargo and Commercial Operation Service Yenisei RSC in April 1995 during the last visit to Krasnoyarsk.

[21] Valuation of Assets from the books of Ob-Irtysh RSC, see also newbuilding prices in Appendix 1 from Krasnoyarsk Shipyard for comparison. Rbl/USD conversion 2100:1 for all figures. Newbuilding prices given by Yuri Vasilievich Rusankin, Director at Krasnoyarsk Shipyard.

Picture 7 : Container - Dry Cargo Barge pushed by 600 Kw tug on the river Ob.

Picture 8 : Passenger "Cruise" vessel on the Yenisey. Identical vessels operate on both the Ob-Irtysh & Yenisey



classified fleet of large bulk belongs to the MSC. [23]All vessels in port, three Dimitri Donskoy-class, one Norilsk-class and one Valya Kotik-class, belonged to the MSC, but Latmar, the Latvian Shipping Company, also operates on the Northern Sea Route and Dudinka.

Picture 9 : River Fleet Port in Dudinka. Railway connecting to the Norilsk Combinate. Nuclear Barge Carrier "Sevmorput in the Background.

Subject to the fact that the railway belongs to the Norilsk Mining Combinate, it is likely that the deep sea port facilities also are owned by the combinate[24]. Consequently, it should only be a question of service and price on the total transportation package which determines the choice of vessels. The above-mentioned should be kept in mind, as the ice damage report[25] from the Murmansk Shipping Company and the lack of capital for newbuildings indicate that employment of the western ice-classified fleet, through joint ventures or normal charter arrangement, is highly likely. The joint venture Arctic Shipping Services[26] also point in this direction.

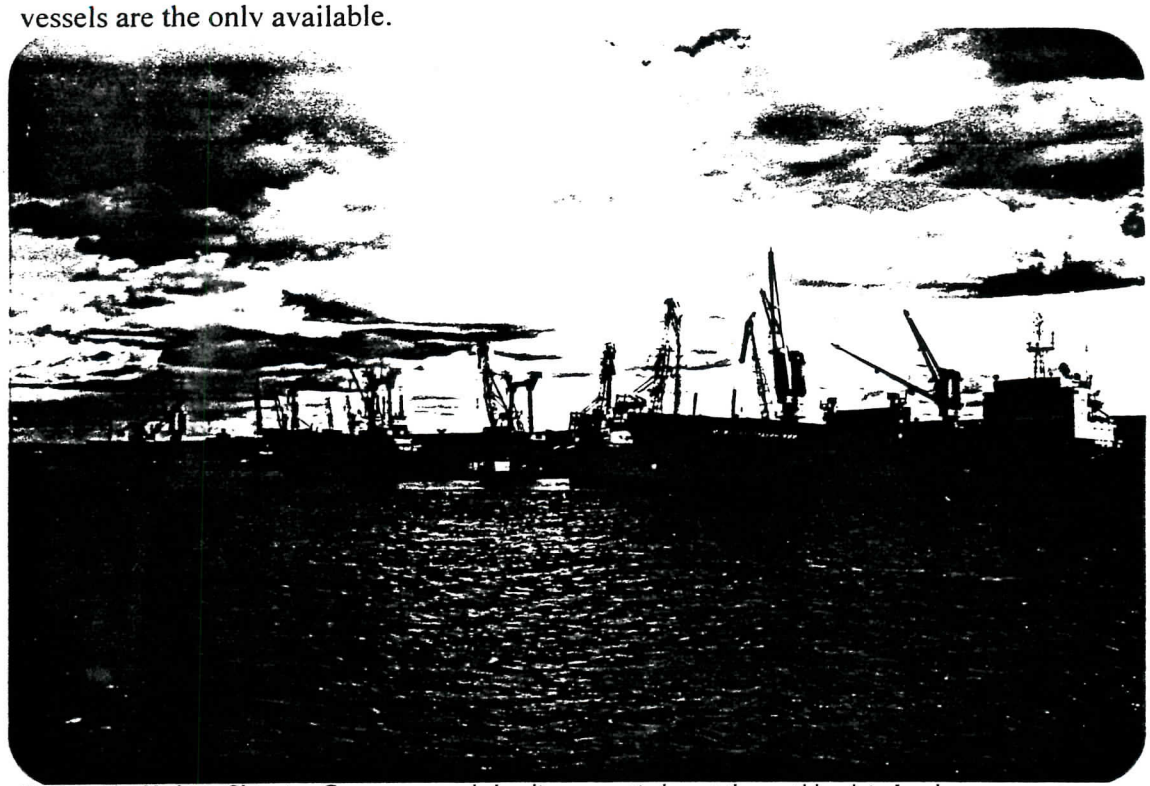
[23] Based on information from H.C.Dall Nygaard

[24] See comment by Reviewer. Murmansk Shipping Company has been asked to clarify this, no response received.

[25] Joint Paper by Murmansk Shipping Company, CNIIMF and Fridtjof Nansen Institute (Restricted circulation).

[26] Neste Oil Company, Kværner Masa Yards, Murmansk Shipping Company, Sovfracht and Rosskomnefteprodukt oil base in Arkhangel.

loader/unloaders or open hatch vessels for combination cargoes are to be used, western vessels are the onlv available.



Picture 10 : Nrthern Shipping Company vessels loading sawn timber at the southbank in Igarka.

4.1.3 Krasnoyarsk.

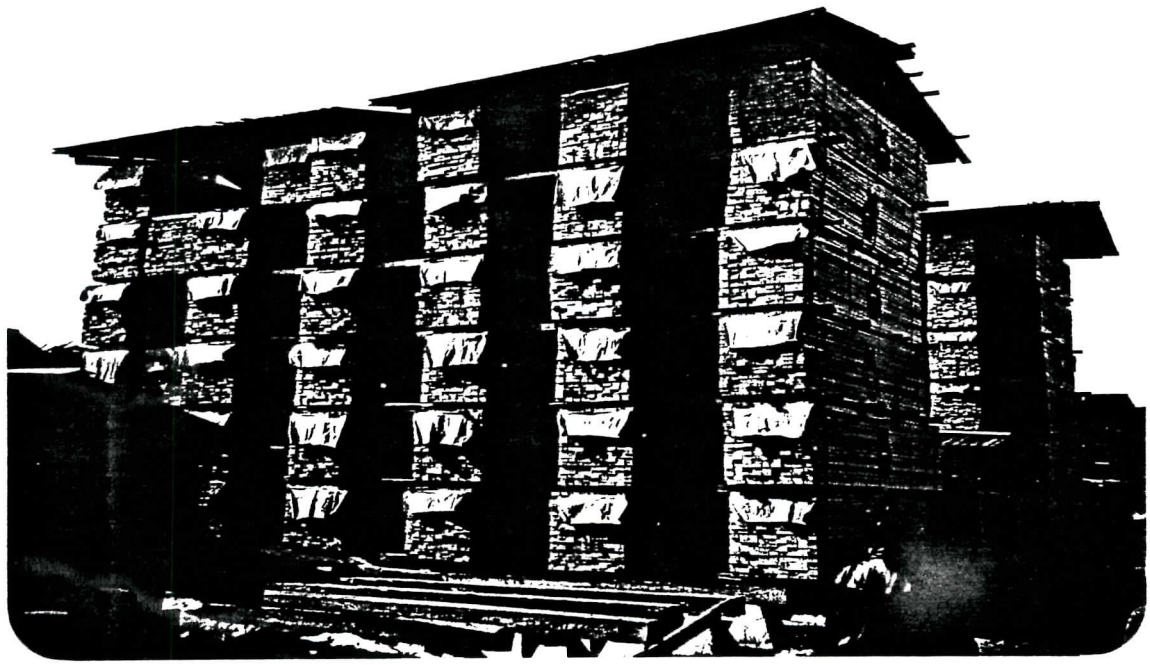
Krasnoyarsk is the largest city and port on the Yenisey. It is the regional centre of the Krasnoyarsk Krai, which stretches from close to the Mongolia border (only split by 200 km by the Tuva Oblast) to the Arctic Ocean north of Dickson. As such it covers the river Yenisey in total. Two Autonomous Okrugs (districts), the Taymyr (Dolga Nenets) and the Evenk are part of the greater Krai (territory). The regional administration and the only shipping company of size the Yenisey River Shipping Company is located in Krasnoyarsk.

The port has several kilometres of seafront, which covers timber, coal, grain, metals and container cargo. The trade out of Krasnoyarsk is mainly industrial products, coal and timber for the Norilsk Mining Combinate, whereas the imports are mainly metals, copper-nickel sheets, coils and billets from the same combinate. Two major shipyards are located in Krasnoyarsk.

4.1.4 Other ports.

The barges with sawn goods at the entrance indicate that some of the processing is done south of Igarka, and finished goods are transported by barge to Igarka. The town of **Strelka** is

and high port tariffs[29] drive up shipping costs. Shipments and contracts tend to be adjusted to whole train sets at 3600 cubic metres (usually 60 wagon loads at 60 cubic metres).



Picture 12 : Neatly stacked and precisely cut sawn timber at the Malakovo Mill in Leseosibirsk. Destination the Middle East through Novorossiysk on the Black Sea.

Historically the combinate shipped annual volumes of 250-300.000 cubic metres northbound on Yenisey to Igarka for further transport via the Northern Sea Route. Currently all contracts are by rail to the Black Sea which serves the Mediterranean and Middle East market, and St.Petersburg which serves the European market.

4.2 Seasonality.

The general picture of the river Ob is valid also on the Yenisey, a short season on the river during summer and fall, with an ice-affected northern part for the remaining year. However, the effective season is prolonged by one major factor, the depth of the river mouth as described below. The traffic between Dudinka and Krasnoyarsk is open from mid - June until

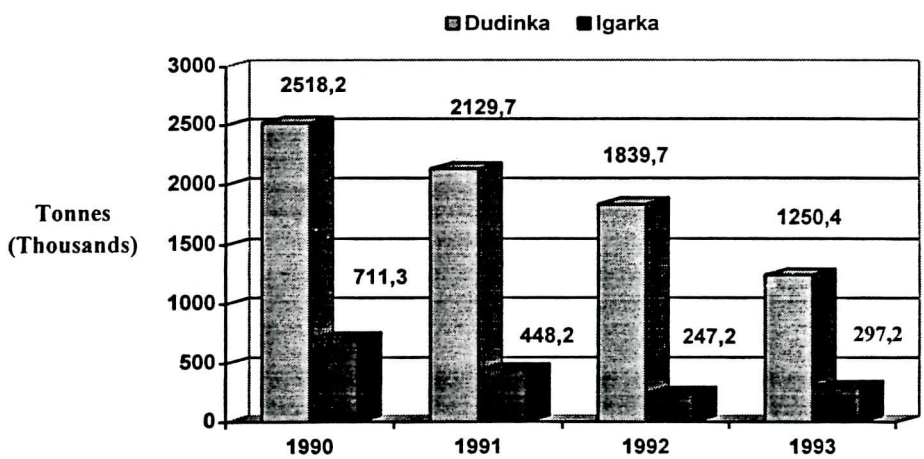
[29] See comments of Reviewer. The port congestion refers to the Baltic and St. Peterburg ports which are used to transfer timber to sea-going vessels. The term is Non-Tariff-Barriers to Trade (NTB). Anyone vaguely familiar with shipping and Russian ports in general , knows that charterers have to pay a significant risk premium to compensate the owner for delays and thereby trading time and revenue when calling Russian ports. This is understandable from a local shipping point of view, and among others, EU cabotage operates on the same principles. The major point however, is that it hurts Russian exporters as much as it affects foreign shipping.

As on the river Ob, there has been a dramatic fall in aggregated cargo volumes on the Yenisey. From a high in 1987 of twenty-seven million tonnes, it was reduced to seven million tonnes in 1993. The distribution of products are shown below Most noteworthy is the dominant position of the round-trip trade Krasnoyarsk-Dudinka. The round-trip trade consists mainly of coal, machinery, industrial products and foodstuffs on the northbound leg, whereas copper and nickel sheet, billets and plates are shipped south.

Oil products, not specified by type, are both for internal consumption in the river basin and export through Dudinka. The exports goes to the rivers further east, Yana, Lena and Khatanga and West Europe.

Under the specification 'others' there are hidden significant volumes of magnetite from upstream Angara, port of destination not quoted, but the vice-President was unsure of the exact figures. When comparing the timber volumes on the Yenisey (Yenisey River Shipping Company figures) and export figures from Igarka (Northern Sea Route Administration figures), we can see that of the total quantity transported on the Yenisey, only 20 percent are seaborne export, the rest for internal consumption

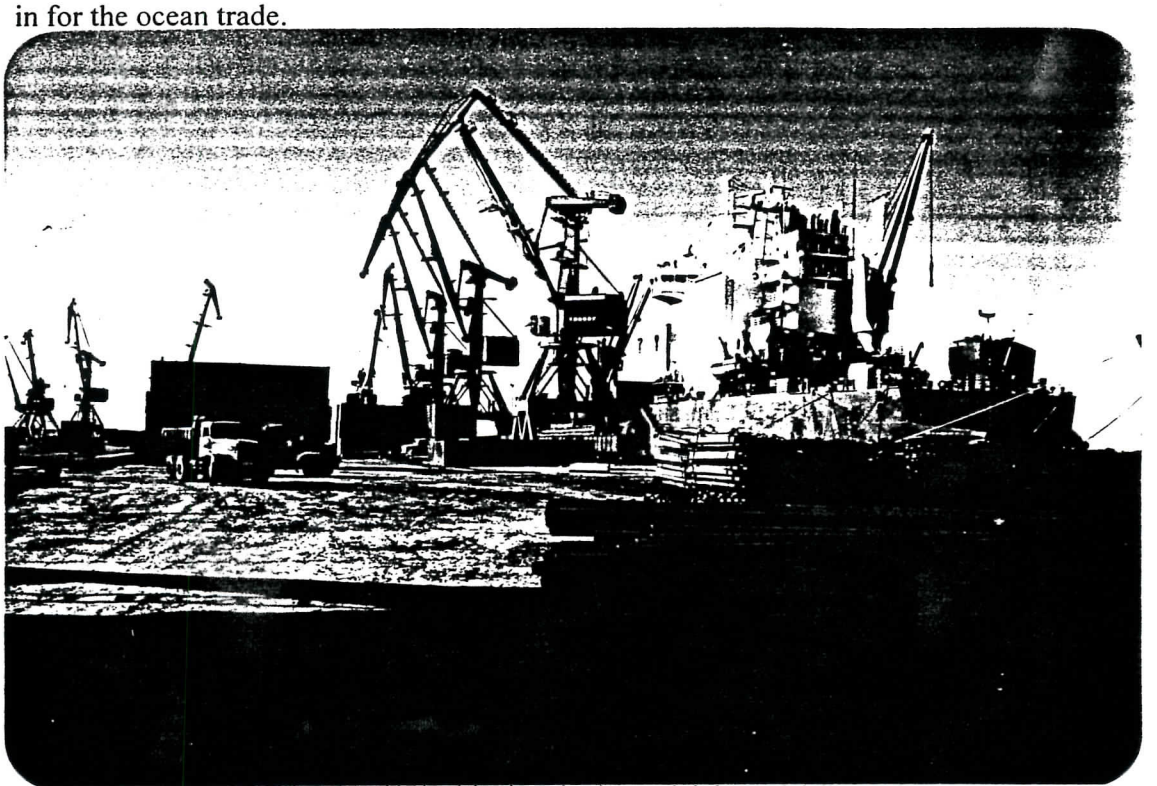
COMMODITY EXPORT FROM YENISEY



If we look at the export of timber from Igarka and metals from Dudinka in the figure above[31] we see that it follows the same pattern as the internal cargo flows. The percent reduction

[31] INSROP Project III.1.1, *The significance of the NSR for the regional development in Arctic areas of Russia.* Aleksander Granberg, SOPS

river mouth. The officers of the company are recruited from the Marine School in Krasnoyarsk, which educates twenty-five officers annually. The officers, however are not educated in celestial navigation which limits their navigation to rivers. This presents a problem for the company as personnel must be either be retrained or new personnel brought in for the ocean trade.



Picture 13 : Yury Arshenevskiy (SA - 15 Norilsk -class) loading nickel sheets & billets in deep water port Dudinka

Picture 14 : Dimitry Donskoy class loading in deepwater port of Dudinka

The costing does not distinguish between the cost of barge transport of dry cargo and oil products, since the costs of the tug operation are the dominant. Although the cost of barge construction is about 25 percent higher for oil products than dry cargo (see appendix 1), the dry cargo barges have a higher depreciation rate than oil products barges, as they are more prone to damages when loading/unloading. In sum it is assumed to equal out.

The cost of river transport is related to the distance involved, and as such the northernmost alternatives have the lowest cost. However, for sourcing of commodities, the prospects are better south on the rivers. For oil products on Yenisey sourcing from the Achinsk refinery through the ports of Krasnoyarsk or Lesosibirsk is a optimal, whereas Omsk has been the traditional source on the Ob-Irtysh. The cost difference for oil products transport between Omsk and Labytnangi to Mys Kamenny is about 12 USD/tonnes, which is well above the assumed cost of railway transport from Uktha/Usinsk to Labytnangi (8 USD/cubic metre).

5.2 The Costs of Deep Sea Transport.

The figure below and Appendix 5 evaluate the cost of deep sea transport from three selected load areas, Mys Kamenny in the Obskaya Guba, Igarka and Dudinka on the Yenisey. The individual cost components are set out in the appendix. The vessels used are both western, the Fonnes (5750 dwt) which is comparable to the Russian timber carriers and General Mojika (19520 dwt), both belonging to Jebsens in Bergen. The timecharter rate which is the main cost component is set at respectively USD 5000 and 8000, which were the current market rates[34]. Market rates for oil products tankers in the identical tonnage segment where roughly equal[35].

As is evident, the effect of deeper draught at Dudinka and thereby economies of scale is significant. The costs of deep sea transport are reduced by slightly more than ten US Dollars per metric tonne. It should also be noted that Mys Kamenny is slightly cheaper than Igarka.

[34] Chartering department, Nomadic Shipping A/S Bergen.

[35] Chartering department, Inge Steensland A/S Oslo.

from Krasnoyarsk to Baltic Ports, the costs are quoted to be forty USD. Between eight and ten USD for seaborne transport from the Baltic's to Northwest European ports, much due to high port charges. Since large amounts of the export timber originate in areas not connected by rail or road, the southbound river transport costs to Lesosibirsk, Yeniseysk or Krasnoyrask must be added.

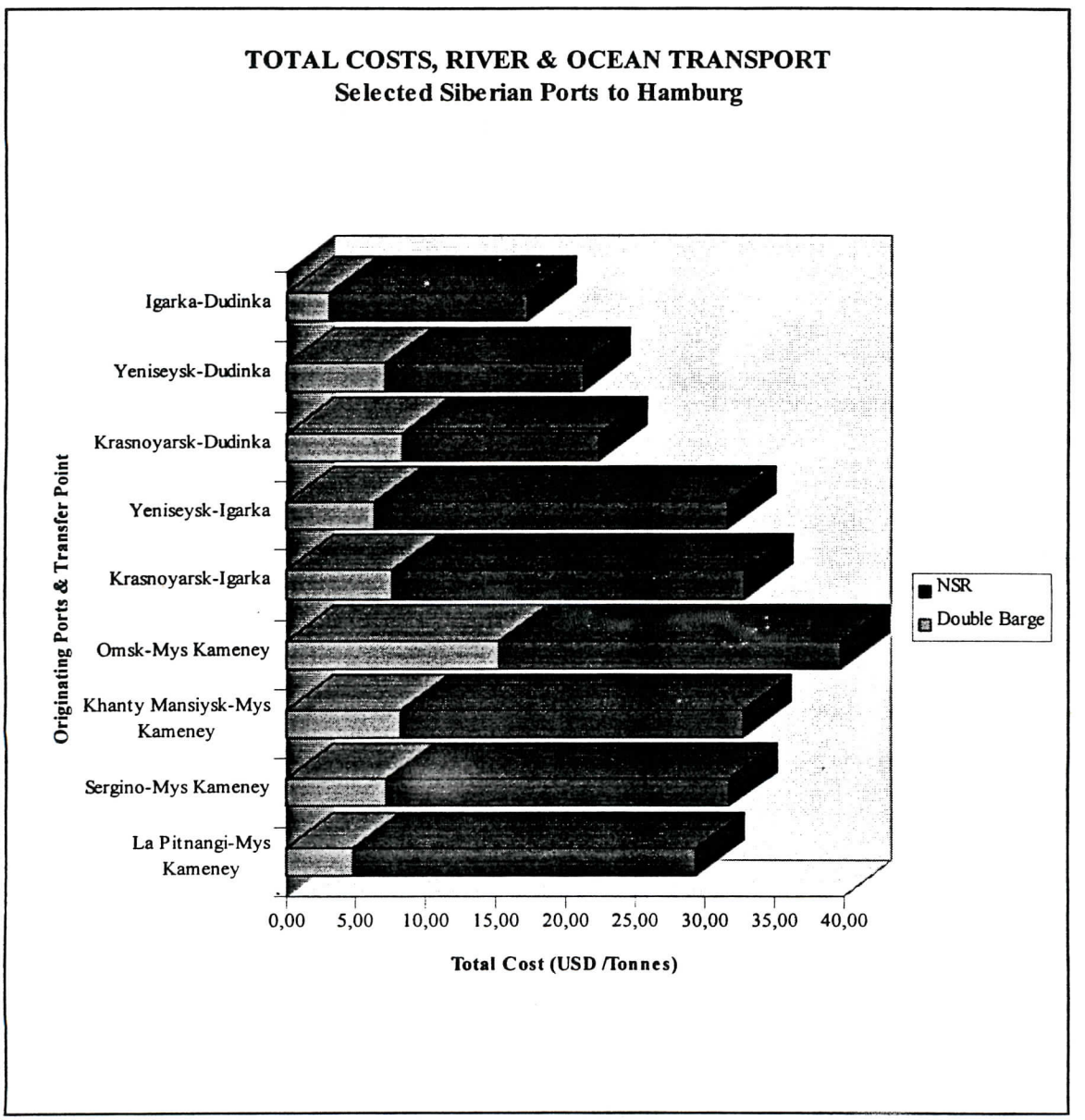


Figure 6

Security of transport is another factor that supports seaborne transport. The high rate of theft and pilferage on the Russian railway system and roads is a major cost driving factor and constraint for the timely execution of operations. This affects both consumer goods and

6. CONCLUSION.

The general economic decline in Russia is reflected in the current situation on the rivers Ob-Irtysh and Yenisey. Falling volumes, lack of capital, rising unemployment and regional disputes are dominant features. However, the infrastructure on the rivers is in a moderate to good condition. Transport capacity is abundant, even after a shift of both the modern and vintage self-propelled fleet out of the rivers to the Baltic Sea,the Mediterranean, Black Sea and the Far East. The river shipping companies are keen and interested in seeking new solutions to generate cash flow. The above-mentioned shift of operation area indicate that the management is adaptable to the changes in the economyIn terms of the relative cost picture and the expected increase in activity in the oil & gas sector in Northwest Russia, the rivers and northern ports are competitive compared to railway transport, if a reasonable match between inbound and outbound cargoes can be found.

For outbound cargoes, timber and metals from the Yenisey basin through Dudinka are the most likely cargoes. Timber and coal from Ob-Irtysh are also potential cargoes. Barter solutions like aluminium oxide and anode mass to the aluminium plant in Krasnoyarsk which require special handling, with return cargo of aluminium should be evaluated. Railway tariffs for specialised cargoes are high as there is a shortage of closed railwagons.

Import cargoes, steel pipes, production equipment and supplies to both western and Russian companies in the Timan Pechora region and the Ob-Irtysh basin could be an essential element. This is subject to a separate study by the MAI Consultants[41], which estimates the potential amount of cargo to about 165.000 tonnes per year. Much of this cargo will be of awkward size and shape, and unsuited for transport by rail. The region is also dependent on the import of consumer goods. In the summer period the Northern Shipping Company brings in about 1.500 containers to Dudinka. This type of trade has a development potential.

[41] INSROP Paper III.7.5, *Seagoing Logistic Solutions to Oil Field Material Supplies*, MAI Consultants (96)

7. APPENDICES

7.1 Appendix 1.

7.1.1 VALUATION OF ASSETS

Krasnoyarsk Shipyard (Newbuildings)[42]	
660 KW Tug	$ 660 000
Barge Dry Cargo, 3000 dwt	$ 300 000
Barge Oil Products, 3000 dwt	$ 390 000
Ob-Irtysh River Company (Book Value of own Fleet)	
Tug, 660 KW	$ 380 952
Barge Dry Cargo, 3000 dwt	$ 252 381

7.1.2 THE EFFECT OF FEDERAL GOVERNMENT TAX ON NON-UTILISED ASSETS

Type	Government Tax on idle Assets , 2%[43]	
	Single	Fleet
Tug, 660 KW	$ 7 619	$ 190 476
Barge Dry Cargo, 3000 dwt	$ 5 048	$ 252 381
Sum, Federal Tax on Non-utilised Assets		$ 442 857
Number of idle Tugs	25	
Number of idle Barges	50	
Total Revenue on Fleet, 50 % operative		$ 6 159 369
Total Profit on Fleet, 50 % operative		$ 2 155 779
Operation Days per Year	120	
Number of Tugs	25	
Number of Barges	50	
Reduction on Profit by Federal Tax on Non-utilised Assets		20,54 %

[42] Figures released by Vice-President, Krasnoyarsk Shipyard

[43] Based on the valuation figures from the Ob-Irtysh River Shipping Company above

7.3 Appendix 3.

7.3.1 DISTANCES (KM) AND BARGE OPERATION SPEED ON OB

	TO	TRANSIT DAYS		TO	TRANSIT DAYS	
FROM	Mys Kamenny	Single Barge	Double Barges	Omsk	Single Barge	Double Barges
Mys Kamenny	0	0,00	0,00	3200	13,33	17,78
Salekhard	450	1,88	2,50	2750	11,46	15,28
La Pitnangi	450	1,88	2,50	2750	11,46	15,28
Myski	636	2,65	3,53	2564	10,68	14,24
Berozovo	844	3,52	4,69	2356	9,82	13,09
Sergino	1090	4,54	6,06	2110	8,79	11,72
Oktjabrskoje	1080	4,50	6,00	2120	8,83	11,78
Karym Kary	1172	4,88	6,51	2028	8,45	11,27
Khanty Mansiysk	1353	5,64	7,52	1847	7,70	10,26
Tobolsk	1980	8,25	11,00	1220	5,08	6,78
Yst Ishim	2366	9,86	13,14	834	3,48	4,63
Znamenskoye	2702	11,26	15,01	498	2,08	2,77
Omsk	3200	13,33	17,78	0	0,00	0,00
Transit Speed						
km/hrs		10	7,5		10	7,5
km/day		240	180		240	180

7.3.2 DISTANCES (KM) AND BARGE OPERATION SPEED ON YENISEY

	TO	TRANSIT DAYS		TO	TRANSIT DAYS	
FROM	Dudinka	Single Barge	Double Barges	Krasnoyarsk	Single Barge	Double Barges
Krasnoyarsk	1989	8,29	11,05	0	0,00	0,00
Yeniseysk	1576	6,57	8,76	413	1,72	2,29
Igarka	245	1,02	1,36	1744	7,27	9,69
Dudinka	0	0,00	0,00	1989	8,29	11,05
Ust Port	-110	-0,46	-0,61	2099	8,75	11,66
Vorontsovo	-401	-1,67	-2,23	2390	9,96	13,28
Transit Speed						
km/hrs		10	7,5		10	7,5
km/day		240	180		240	180

7.5 Appendix 5.

7.5.1 TRANSPORTATION COST LOAD PORTS OB-YENISEY TO EUROPE, Mys Kammeny - Hamburg, 5750 dwt vessel

From	To	Distance
Mys Kamenny	Karski Varota	630
Karski Varota	Hamburg	2050
Total		2680

	Vessel Size		
Vessel Name	Dead-weight	SCNT	Displacem.
Fonnes	5750	3000	

Speed Overall	12
Duration	
Transit Days	9,31
Load/Unload	7
Total	16,31

Transit Fees based on Suez Rates		
Input Parameters		
NOK/SDR	9,98	
USD/NOK	6,80	
USD/SDR	1,47	
SCNT	3000	
Rate (SDR)	2,97	

Cost of Transport using current NSR Rates				Full Suez	Half Suez	No Transit
Cost Item	**Unit**	**Price**	**Total**	**Rates**	**Rates**	**Rates**
Timecharter Rate		$ 5 000	$ 81 528			
Fuel Consumption	Tonnes/Day	$/Tonnes				
MDO at Sea	1,5	160	$ 2 233			
MDO in Port	3	160	$ 3 360			
MFO :	14	90	$ 11 725			
Port Charges			$ 10 000			
Pilotage & Lights	Days	Rate				
	5	210	$ 1 050			
Ice Tariffs	Dead-weight	Rate				
	5750	5,46	$ 31 395	$ 13 077	$ 6 538	0
Voyage Total			$ 141 291	$ 122 973	$ 116 434	$ 109 896
$/Tonnes			$ 24,57	$ 21,39	$ 20,25	$ 19,11

7.5.3 TRANSPORTATION COST LOAD PORTS OB-YENISEY TO EUROPE, Dudinka - Hamburg 19 520 dwt vessel

From	To	Distance
Dudinka	Karski Varota	608
Karski Varota	Hamburg	2050
Total		2658

	Vessel Size			Transit Fees based on Suez Rates
Vessel Name	Dead-weight	SCNT	Displacem.	
General Mojika	19520	10180		

		Input Parameters	
Speed Overall	12	NOK/SDR	9,98
		USD/NOK	6,80
Duration		USD/SDR	1,47
Transit Days	9,23	SCNT	10180
Load/Unload	7	Rate (SDR)	2,97
Total	16,23		

Cost of Transport using current NSR Rates				Full Suez	Half Suez	No Transit
Cost Item	**Unit**	**Price**	**Total**	**Rates**	**Rates**	**Rates**
Timecharter Rate		$ 8 000	$ 129 833			
Fuel Consumption	Tonnes/Day	$/Tonnes				
MDO at Sea	3	160	$ 4 430			
MDO in Port	6	160	$ 6 720			
MFO :	20	90	$ 16 613			
Port Charges			$ 10 000			
Pilotage & Lights	Days	Rate				
	6	210	$ 1 260			
Ice Tariffs	Dead-weight	Rate				
	19520	5,46	$ 106 579	$ 44 374	$ 22 187	0
Voyage Total			$ 275 435	$ 213 230	$ 191 043	$ 168 856
$/Tonnes			$ 14,11	$ 10,92	$ 9,79	$ 8,65

APPENDIX

Review by Jørgen Ole Bærenholdt, Roskilde University, Denmark.

Jørgen Ole Bærenholdt 29 January 1996

Review of INSROP project III.01.3 Development of Oil and Gas Exports in Northern Russia -
title:
The NSR AND THE RIVERS OB-IRTYSH & YENISEY, A prelimenary Analysis of Cargo volumes, Infrastructure and Freight Rates, by Trond Rangnvald Ramsland and Hans Christian Dall Nygård.

General comments.

This is first of all a field report giving some information about possibilities of river and rail transport sourcing the NSR. Three cases are described:

- The Northern railroad from Yaroslav to Vorkuta and La Pitnangi (in the river Ob delta)

- The river Ob-Irtysh from Salekhard to Khanty Masiysk and Omsk

- The river Yenisey to Dudinka-Norilsk

A sample of ports are described in terms of technical conditions. And potential costs of using river transport (and NSR) is calculated on the basis of cost levels, which the authors on the other hand only have one source for.

The advantage of the report is, that it obviously is building on **first-hand observated field information** - which gives the paper a qualitative dimension, which was not possible without field work. The disadvantage of the approach is, that the information collected is rather accidential - but on the other hand raises many new good questions, which ought to be investigated in more detail. I am surprised that the report does not refer to earlier (and published) INSROP reports within III.02.3 (Aanesen/Høifødt/Nygaard, 1995: Northern Sea Route and possible regional consequenses) or to other works by Vigdis Nygaard (Finnut in Vadsø) on the oil/gas industry. The report would be improved if field information was combined with information from more other sources.

Formal comments.

It is very positive, that the paper already on page 1 clearly states its "aim of study", "focus of the study", "limitations of the study" and "methodology of the study". As interviews proved better than avaibale statistics, the paper lacks a more comprehensive discribtion of the **field trips** (when?, where?, how long?, by who?) and some considerations about the interview methods.

Graphic figures are well produced (but signatures ought to be more differentiated - otherwise the difference between then

p.17 lack of confirmation of Norisk Mining Combinate ownership of port fascilities (although I agree it is likely)

p.19 interesting: Malakovo has changed means of transport from river/NSR to railway - where is the port congetion, which is part of the problem? Are railways subsidied more than shipping?

p.20 figure lacks source

p.21 "only 20 percent are..." at least one word missing (exported?)

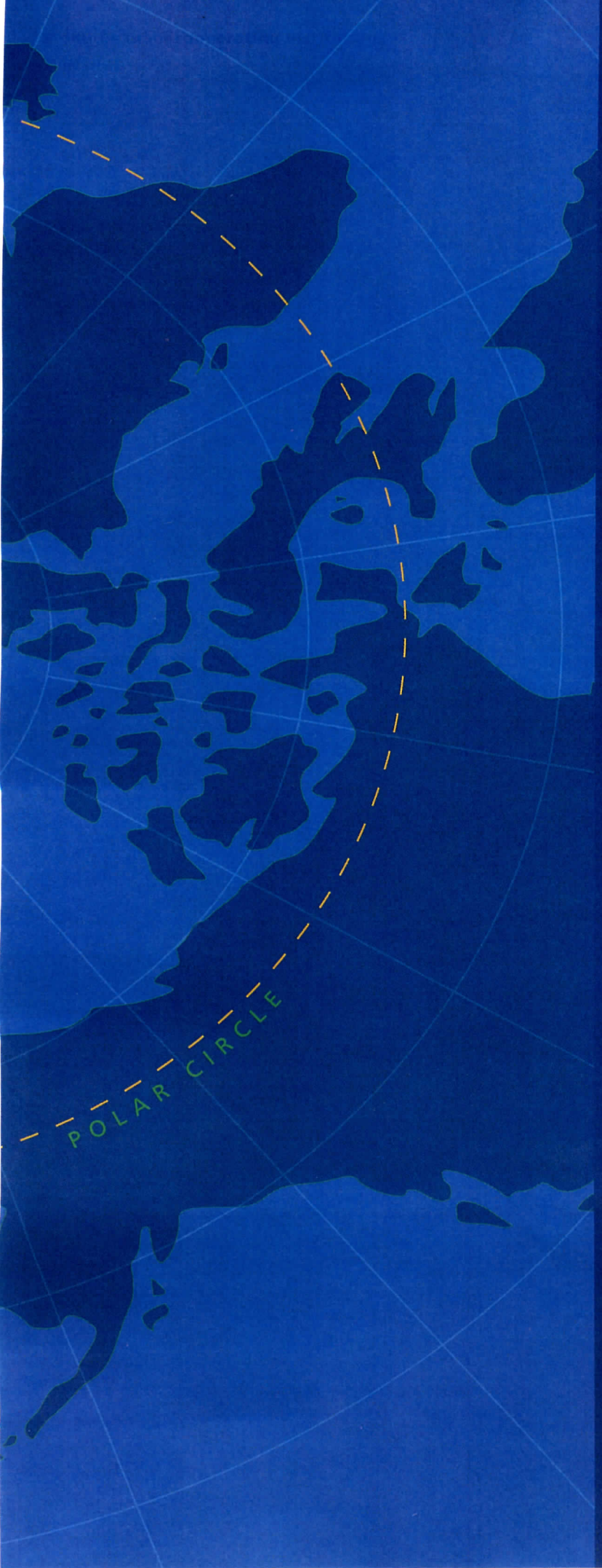
p.21 good consideration on export licences and official unnoticed exports

p.21 processing of nickel is now done in Norilsk - not in Dudinka (as far as I remember from the field study of two of my students - Linda Kyndlev and Kamma Tulinius - in Dudinka and Norilsk - their report was used in the earlier INSROPstudy by Aanesen, Højfeldt and Nygaard)

p.24 lack of consideration of reliability of basing all calculations of river transport costs on figures of one interview person (a Vice-President of one of the River shipping companies). Considerations on reliability in text and calculations on possible +/- uncertainty could be done.

p.25-26 and appendix 5:
on realiability of calculations of costs of deep sea transport (where there maybe later could be a more comprehensive reference for the seperate INSROP project in rates): How are current NSR rates calculated? It is not clear to me whether or not the information on current rates (USD 5000 and USD 8000 in timecharter by vessels of Jebsens in Bergen - also valid for Murmansk Shipping Company or Northern Shipping Company?) is used directly for calculation of "current NSR structures of fees". This information ought to be compared with actual current fees of Murmansk Shipping Company or Northern Shipping Company (all though stated - without documentation - to be "non-competitive in terms of efficiency in port and quality of cargo handling" in the end of the conclusion (p.30))

p.27-30 conclusion contains to much new information, which could either be earlier in the report - or just be raised as questions for further investigation



The three main cooperating institutions of INSROP

Ship & Ocean Foundation (SOF), Tokyo, Japan.

SOF was established in 1975 as a non-profit organization to advance modernization and rationalization of Japan's shipbuilding and related industries, and to give assistance to non-profit organizations associated with these industries. SOF is provided with operation funds by the Sasakawa Foundation, the world's largest foundation operated with revenue from motorboat racing. An integral part of SOF, the Tsukuba Institute, carries out experimental research into ocean environment protection and ocean development.

Central Marine Research & Design Institute (CNIIMF), St. Petersburg, Russia.

CNIIMF was founded in 1929. The institute's research focus is applied and technological with four main goals: the improvment of merchant fleet efficiency; shipping safety; technical development of the merchant fleet; and design support for future fleet development. CNIIMF was a Russian state institution up to 1993, when it was converted into a stock-holding company.

The Fridtjof Nansen Institute (FNI), Lysaker, Norway.

FNI was founded in 1958 and is based at Polhøgda, the home of Fridtjof Nansen, famous Norwegian polar explorer, scientist, humanist and statesman. The institute spesializes in applied social science research, with special focus on international resource and environmental management. In addition to INSROP, the research is organized in six integrated programmes. Typical of FNI research is a multi-disciplinary approach, entailing extensive cooperation with other research institutions both at home and abroad. The INSROP Secretariat is located at FNI.