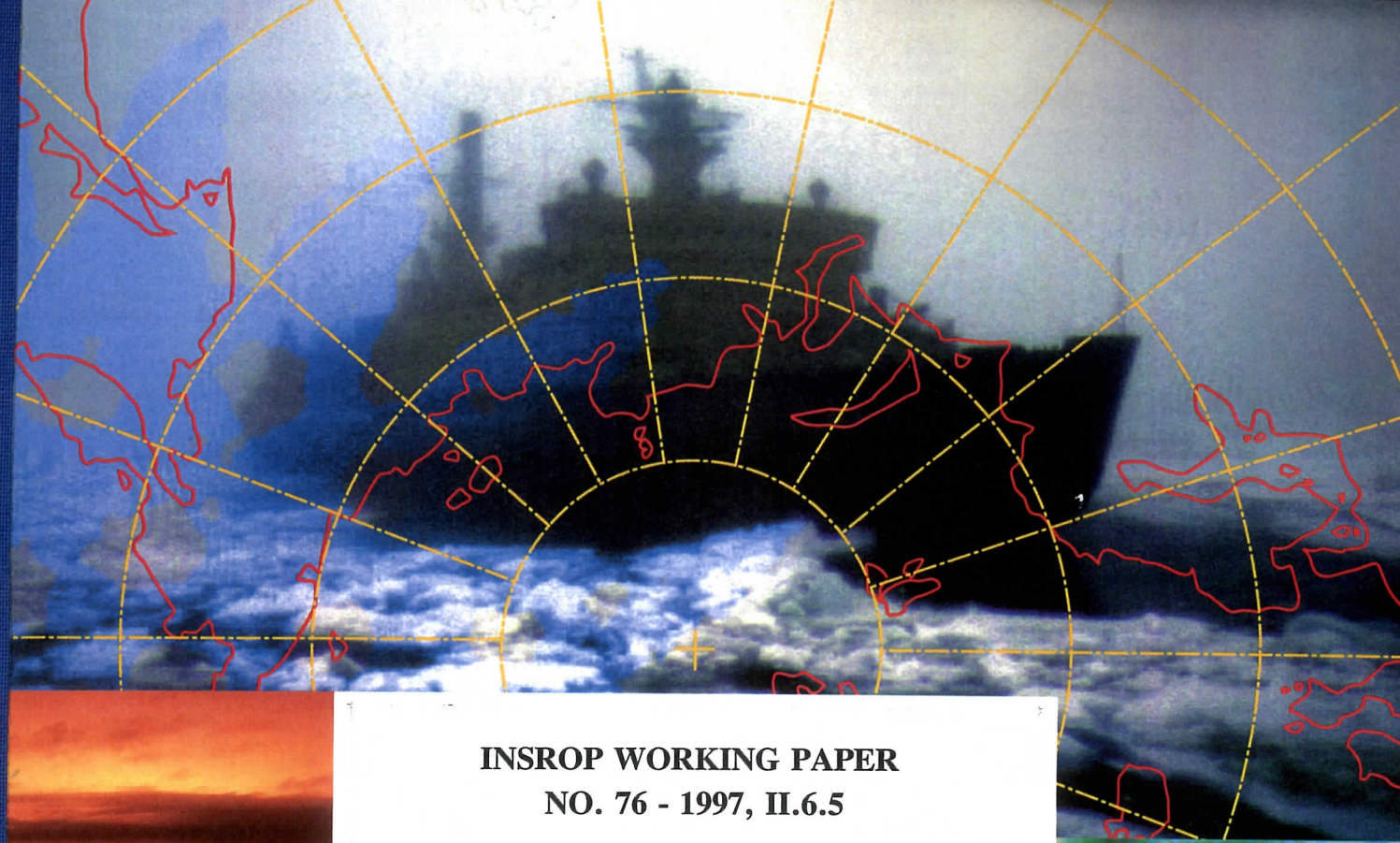
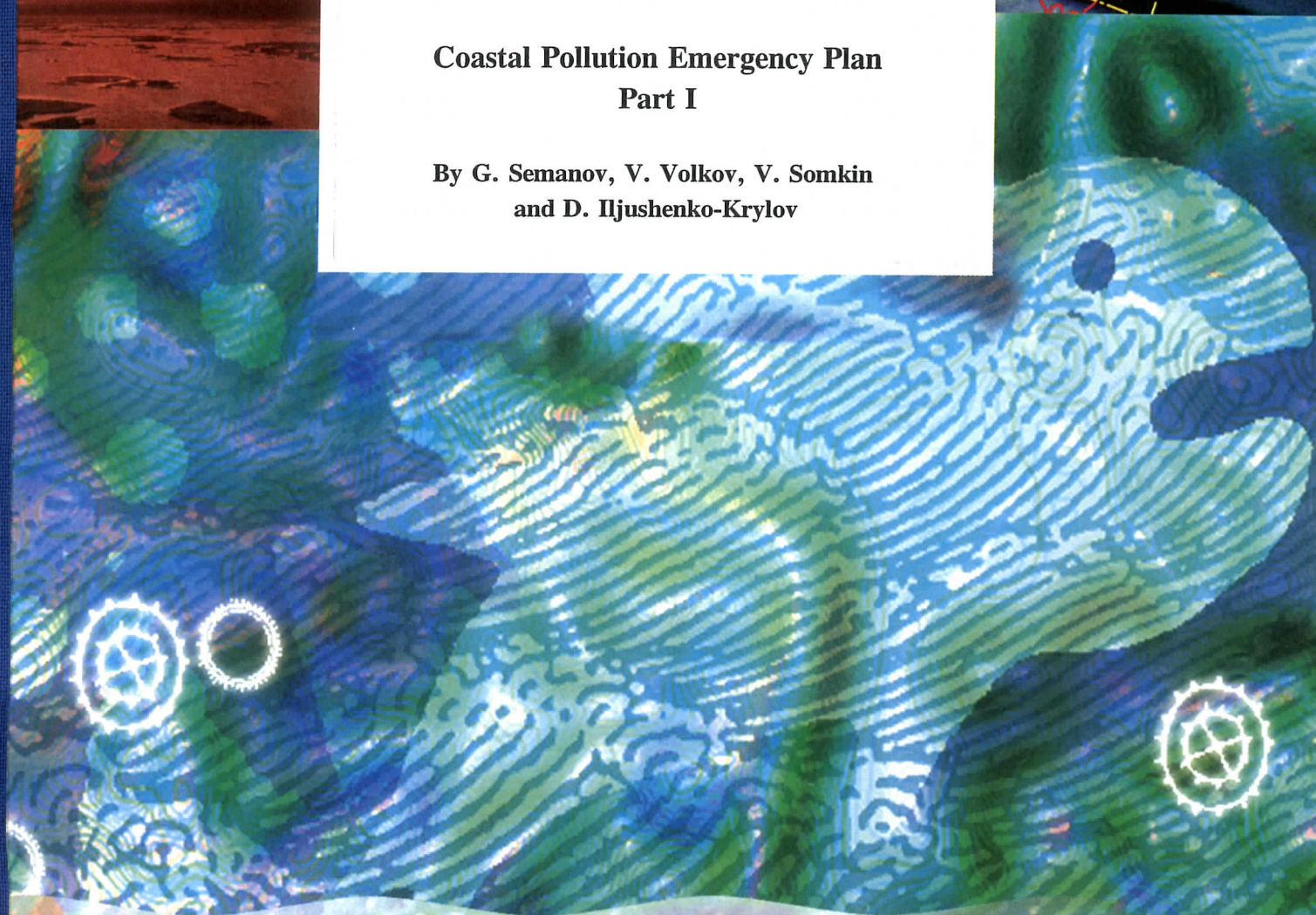


INSROP WORKING PAPER
NO. 76 - 1997, II.6.5

Coastal Pollution Emergency Plan
Part I

By G. Semanov, V. Volkov, V. Somkin
and D. Iljushenko-Krylov



INSROP International Northern Sea Route Programme

Central Marine Research & Design Institute, Russia

The Fridtjof Nansen Institute, Norway

Ship and Ocean Foundation, Japan

International Northern Sea Route Programme (INSROP)

Central Marine Research & Design Institute, Russia

The Fridtjof Nansen Institute, Norway

Ship & Ocean Foundation, Japan

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Sub-programme II:	Environmental Factors
Project II.6.5:	Coastal Pollution Emergency Plan
Supervisor:	Gennady Semanov
Title:	**Coastal Pollution Emergency Plan (Part I)**
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This publication forms part of a Working Paper series from the **International Northern Sea Route Programme - INSROP**. This Working Paper has been evaluated by a reviewer and can be circulated for comments both within and outside the INSROP team, as well as be published in parallel by the researching institution. A Working Paper will in some cases be the final documentation of a technical part of a project, and it can also sometimes be published as part of a more comprehensive INSROP Report. For any comments, please contact the authors of this Working Paper.

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 efficiency of shipping. Russia, being 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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ABBREVIATIONS

BED	Basin emergency division
BOSCP	Basin oil spill contingency plan
DM	Defense Ministry
Emercon	Ministry for combating emergency situations and natural disasters
FEBED	Far East Basin Emergency Division
INSROP	International programme for development of the NSR
MBED	Murmansk Basin Emergency Division
MPCSA	Maritime pollution control and salvage Administration
NSR	North Sea Route
NSRA	Administration of the North Sea Route
OMS	Operational management staff for governing of oil spill combating operations
OSC	Oil spill combating
OSCP	Oil spill contingency plan
SMI	Special Marine Inspection of the Ministry for Nature Protection and Natural Resources Conservation

SUMMARY

A higher degree of ecological safety of the ship traffic is dependent not only upon onboard measures, but is also closely associated with the shore, particularly with the reception facilities for collection and treatment of ship generated wastes and the preparedness for combating the emergency oil spills. The problem is particularly acute in the NSR because of:

- exclusively high vulnerability of the Arctic ecosystems,
- very low rates of natural degradation of oil in the Arctic seas,
- absence of a forward coastal infrastructure,
- low efficiency of the oil combating means in ice conditions,
- severe climatic conditions in the Arctic

While in the recent years there have been no oil spills in the NSR, they are quite likely to happen in the near future as the off-shore production and transportation of oil by ships and pipes is planned. Therefore, the preparedness for the oil spill combating becomes very important, one aspect of which being the development of the Oil Spill Contingency Plan (OSCP).

The principal objective of the plan is to gain the response and preparedness, the preparation and organization of major operations for OSCP through the use of capabilities and sources of a response organization assisted by some others concerned.

The OSCP of NSR is a regional plan. There are three following levels of creating it:

- Development of concept, definition of response organizations and technical ability of them. (Part I)
- Collection and analysis of information, development of scenarios of probable oil spills, clearing of the funding mechanism and the basis for additional outside cooperation in case of emergencies from other Russian regions and circumpolar countries. (Part II)
- Development of the NSR oil spill contingency plan. (Part III)

The goal of the 1995 work is to solve the aims of the first level.

The NSR oil spill contingency plan's concept will take into account

- subdivision of the Route into two eastern and western response areas;
- interaction and links between responsible organizations;
- existing realities of the Russian Arctic, such as transport, communications, energy, labour resources, etc.;
- requirements of the IMO and of the International Convention OPRC 90 which will be shortly joined by Russia.

According to the Russian legislation on the environment protection from pollution and on combating the emergency oil spills, implementation of the combating operations at sea is the responsibility of the MPCSA that consists of the Central Administration (CA) and the basin emergency divisions (BEDs). For combating the emergency oil spills in the seas of the NSR, two basin divisions are designated: the Murmansk basin emergency division (MBED) is responsible for the western Arctic and the Far East basin emergency division (FEBED) for the eastern Arctic. The divisions are centered in the non-freezing ports of Murmansk and Nahodka respectively which have most powerful and equipped bases for salvage operations, aircraft bases and airports in their vicinities, and an advanced infrastructure. The MPCSA is in charge of carrying out cleaning operations at sea from installations, either governmental or private. The operations can be assisted with resources and means of the co-operating organizations and helped by those of other countries in accordance with international agreements of the Russian Federation. For some areas of the NSR Russia has such agreements with Norway (for the Barents Sea) and with the United States (for the Bering Sea).

By analogy with a staff for ice operations, for immediate control of the oil spill combating (OSC) operations the plan should provide for establishment of the operational management staff (OMS) that should periodically meet to assess the efficiency of the plan, exercises, and drills. The OMS should include representatives of region administrations the ice operation headquarters, the Emercon, control authorities and the largest co-operating organizations; and it should be headed by the administration of the region where a spill has occurred. The OMS should be added by a working group and assisted by an expert group. The on-scene commander at sea is usually the head of BED. For reception, processing and transmission of information, the plan should provide for the use of existing Arctic communication centers, as well the possibility of creating temporal communication points. The plan should specify high risk zones, priority areas for protection, data on actual and expected amount of oil traffic and estimates of likely volumes of the emergency oil spills. A11 the information is presented in projects of the I, II and III subprogrammes of the INSROP Programme. The present report (Part I) provides the plan's concept, rescue organizations and data on types and amounts of the oil spill combating technical means and of the floating facilities available in the NSR or in its vicinity.

CONTENTS

INTRODUCTION

A higher degree of ecological safety of the ship traffic is dependent not only upon onboard measures, but is also closely associated with the shore, particularly with the reception facilities for collection and treatment of ship generated wastes, and with the preparedness for combating the emergency oil spills. The problem is particularly acute in the NSR because of:

- exclusively high vulnerability of the Arctic ecosystems,
- very low rates of natural degradation of oil in the Arctic seas,
- absence of a forward coastal infrastructure,
- low efficiency of the oil combating techniques in ice conditions,
- severe climatic conditions in the Arctic.

While in the recent years there have been no oil spills in the NSR, they are quite likely to happen in the near future as the off-shore production and transportation of oil by ships and pipes is planned. Therefore, the preparedness for the oil spill emergency becomes very important, one aspect of which being the development of the oil spill contingency plan (OSCP). Three levels of planning are recognized in Russia: local (a shipboard emergency plan, a port, etc.), regional and national plans. In the former USSR there have been developed and implemented plans for ports and Arctic regions, which covered the NSR. The Murmansk and Far East shipping companies, were designated as response organizations. But now these plans became obsolete and cannot be used because of great changes in the economy and policy creating of the country. The present 1995 work is aimed at the development of an OSCP for the NSR. It is the first part of the project and contains a plan's concept and draws up the response organizations and the inventory of types and amounts of oil spill combating technical means, and special oil recovery and supplying ships available for OSCP operations.

1. The concept of the Oil Spill Contingency Plan for the NSR

Considering great distances, severe climatic conditions, rare population and absence of large all-seasonal ports in the Arctic, one can conclude that no single structure, such as a basin emergency division, would be capable to maintain response preparedness for oil spill combating. It will be reasonable to divide the NSR into two - eastern and western - zones, as was previously done for ensuring the navigational safety. In developing the plan's concept, the following matters

should be considered, as the IMO Guidelines recommend: organizations responsible for the OSCP, with clear and individual identification of their rights and duties; limits of response areas; character of shipped oils; places of likely spills (zones of high spill risk); probable oil outflow and its behavior in ice conditions; protection priority zones; technical and floating facilities for the storage of recovered oil and the transportation of pollution response resources in to and out of the affected area to a spill site; warning and communications; financial matters of ensuring the OSCP operations.

IMO recommends three levels of preparedness and response for OSCP: Tier One - a small spill under 700 t; Tier Two, an average spill that needs involvement of resources of cooperating organizations; and Tier Three, a major spill requiring the mobilization of all national resources for OSCP and the assistance from foreign countries. But the target figures are rather overestimated for the Arctic, and a small spill should be reasonably considered as the one under 50 t. In preparing the plan, a consistency should be provided between the respective plans for ships, ports, and oil and gas industries. In the OSCP in the Arctic, all possible measures should be first taken to reduce and prevent oil outflows into the sea, while the clean-up operations on the shore can be delayed and the priority should be given to operations of collecting oil by mechanical equipment. The use of microorganisms and dispersants in seas of the NSR, seems to be limited or ruled out. It should be also taken into account that mechanical recovering equipment is mainly applicable only in ice-free waters and is ineffective where ice occurs. In the latter case, the oil could be burned or collected together with ice and then separated after melting of ice.

2. Organizations responsible for oil spill contingency operations along the NSR

According to the Russian legislation on the environment protection from pollution and on combating the emergency oil spills, implementation of the OSCP operations in sea are assigned to the Maritime pollution control and salvage administration (MPCSA) that consists of the Central Administration (CA) and the basin emergency divisions (BEDs). For combating the emergency oil spills in the seas of the NSR, two basin divisions are designated: the Murmansk emergency division (MBED) is responsible for the western Arctic and the Far East emergency division (FEBED) for the eastern Arctic. The divisions are respectively centered in non-freezing ports of Murmansk and Nahodka which have most powerful and equipped bases for salvage operations, aircraft bases and airports in their vicinities, and an advanced infrastructure. No other ports along or near the NSR have such resources as above said. The MPCSA is in charge of carrying out up the OSCP op-

erations at sea from installations of any owner, either a private or the government. The operations can be assisted with resources and means of the co-operating organizations, ministries and agencies of Russia (e.g. Defense Ministry, Roshydromet, Federal Frontier Service, Emercon, the sea and river shipping companies, etc.) and with resources of some foreign countries in accordance with international agreements of the Russian Federation. For some areas of the NSR, Russia has agreements with Norway for the Barents Sea and with the United States for the Bering Sea.

For immediate command of the OSCP operations, the plan should consider the establishment of an operational management staff (OMS) that should periodically meet to assess the efficiency of the plan, exercises and drills. The OMS should include representatives of the administration of the region where a spill has occurred, of Emercon, the local control authorities and the largest cooperating organizations, the staff being added by a working group and assisted by an expert group. The staff is headed usually by the Head of Administration, the Head of BED being the On Scene Commander. The plan should clearly specify duties of every member of OMS.

3. Geographical subdivision of the response areas

A traditional practice of ensuring the shipping safety is a conventional subdivision of the NSR into two parts, eastern and western, with the 125°E boundary in between. With this in mind, it is reasonable to accept the same line to divide the response areas in the OSCP plan. The western part of the Russian Arctic is under control of the MBED and the eastern part is under control of the FEBED. In view of a close relationship between the Barents Sea and the NSR's seas, the contingency plan for the NSR should cover not only the Laptev Sea, the Kara Sea, the East Siberian Sea and the Chuckchee Sea, but the Barents Sea as well. Such a need is understandable from the fact that major oil traffics and the off-shore production of oil, hence potential sources of larger accidental oil spills, are situated in the Barents Sea and the Pechora Bay. Then the boundary of the MBED response area will pass through the following points:

(A) 69°47'N, 30°5O'E;
(B) 69°51'N, 31°06'E;
(C) 70°03'N, 32°00'E;
(D) 74°00'N, 32°00'E;
(E) 74°00'N, 33°30'E;
(F) 73°18'N, 33°30'E;
(J) 73°06'N, 40°42'E;
(K) 73°44'N, 41°15'E;
(L) 74°00'N, 41°36'E;
(M) 74°52'N, 41°45'E;
(N) 75°25'N, 43°12'E;
(O) 76°00'N, 43°30'E;

(G) 73°10'N, 34°24'E;
(H) 73°03'N, 36°00'E;
(I) 72°14'N, 40°30 E;
(P) 76°44'N, 44°42'E;
(Q) 76°53'N, 43°05'E;
(R) 77°45'N, 45°15'E

and further along the boundary of the RF polar domain up to the point of crossing with a conventional line of the minimal ice extent (in July-October), then eastward, along this conventional line, up to the point of crossing with the 125°E meridian, then southward, along the 125°E, up to the coast line. As a whole, this boundary is the western limit for the FEBED responsibility area. The eastern limit will be the state frontier between the Russian Federation and the United States, passing through the Chuckchee Sea and the Bering Strait.

4. Data transmission and communications

On account of the weak infrastructure in the northern regions, the most reliable technique of data transmission and communication is by radio. Points for reception of the oil spill data are on the Arctic seashores in Murmansk, Archangel, Tiksi, Dikson and Pevek. Messages from ships and aircraft are transmitted to a salvage-coordination subcenter. For the NSR, it is situated in Tiksi. Other receivers of the spill information are regional marine inspections of the RF Ministry of Nature, the ice operation headquarters and the NSR Administration. In the future the reception points are to established in vicinities of the oil production areas. In developing the OSCP, one should also consider the possibility of using, for spill detection and data transmission, the communication and detection facilities owned by the Ministry of Defense or the Federal Frontier Service.

5. Oil traffic by the NSR

The main body of such information is presented in the reports of the INSROP III Subprogramme "Trade and commerce aspects *of* navigation". Here such a kind of information is given only shortly.

To supply the consumers in the Arctic points with oil products, the required quantities of the products are hauled by the sea-going or river tankers during the arctic navigational season or in winter.

In the basin, there are several major points ensuring the oil shipment by the sea.

In the fishing port of Murmansk (the joint Russian-German company Murman-Oil), the oil cargo traffic equals 750000 t, including 350000 t for export. The port has some storages for the heavy oil products (5 x 4000 t).

In proximity to Severomorsk, two naval bases can accommodate tankers up to 16000 t deadweight. One of the bases has storages for 200000 t of oil products. The traffic is effected by the Murmansk company Arctic Shipping Services on ships LUNNI and OIKKU of the ice-strengthened class, calling also at ports on the Arctic coast. According to the existing forecasts by 2001, the shipment of oils for export from the two ports will amount to 24000000 t per year, including delivery of 750000 t to the Arctic ports.

In Archangel, oil is shipped from the base Roscomnefteproduct. Storage capacities are available for 220000 t, including those for 40000 t of heavy fuels, 40000 t of gasoline and 120000 t of diesel fuel. By way of the off-shore loading, tankers up to 16000 t dwt can be handled. The delivery to the Arctic ports equals 750000 tons per year, and the exports amount to 500000 t. The foreseen potential of the port is 15000000 tons per year.

From the Kolguev Is., the trust Arcticmorneftegasrazvedka exports 50000 t of crude oil per year, and the Archangelgeologia has an export license for 100000 tons per year.

Among lines of most notable importance is the traffic of oil products from the oil handling terminals of Archangel and Murmansk to the Yamal Peninsula by the NSR. Points of discharge on the peninsula are the port-point Harasaway, the cape Pionerskyi, the Iondayaha River and the Mordyaha River. The marine oil traffic is mainly effected by tankers of the types SAMOTLOR and VENTSPILS. In winter, a tanker, conducted by an icebreaker to Harasaway on the Yamal Peninsula, stays for unloading of the delivered oil at a distance of 6 km from the storage yard. From tanker to the yard a collapsible pipe PTM-150 is laid. In summer, tankers approach the shore more closely, and the pipe length is 4 km.

Most of the oil products delivered to Yamal are transported by river tankers from the side of the Gulf of Ob, in a range from Surgut to the New-Port village, i.e. through the eastern coast of Yamal.

In the near future, 2000-2005, the oil delivery to Harasaway by sea and river tankers will be about 170000-180000 ton per year.

A large cargo flow goes from the west to Dudinka, Hatanga and Tiksi. The oil is carried by sea-going tankers and, if to Dudinka, also by river tankers owned by the Enisei River Shipping Company. The oil traffic to Dudinka is about 300O00 ton per tear.

From October to May, ships of the IS class, the types of NORILSK and MIKHAEL STREKALOWSKIY, carry the bunker fuel oil for icebreakers and all other types of ships. The bulk of the bunker fuel oil is mazut. The bunker is transferred to icebreakers along the NSR, excluding the section Murmansk-to-Kolguev Is. The bunker oil volumes are about 40000 t.

Oil traffic to the southern points of the Novaya Zemlya Islands, to the points of the Pechora Bay, to the Vilkitskyi Is. and to the points of the Enisei Gulf are about 5000 t.

The crude oil is presently carried by river tankers on the route from the Kolguev Is. to the port Kandalaksha, the volume being about 60000 ton per year. In the near future of 2000, exploitation of the oil field PRIRAZLOMNOYE will begin, with the planned export of about 6000000 ton per year of crude oil.

In the Gulf of Ob, river tankers of types VOLGA-NEFT and LENA-NEFT carry about 230000 ton per year of diesel fuel, kerosene and petrol. The traffic in the Tazovskaya Guba is about 50000-60000 ton per year.

Ships of the Enisei Shipping Company carry about 400000 ton per year of oil cargoes on the lines Krasnoyarsk-to-Dikson, Krasnoyarsk-to-Gydanskaya Guba and Krasnoyarsk-to-Pyasina River.

6 High risk zones

The most probable zones of the high oil spill risk are the areas of the extensive shipping of large volumes of oil or places where transport lines are crossing each other in presence of navigational dangers (shallow waters, narrows, straits, underwater rocks and mountains, ices, strong currents and winds, etc.). All these traits are most completely presented in the western Arctic where year-round navigation occurs in very complicated hydrometeorological conditions and where ever increasing volumes of crude oil and oil products are carried.

Among different oil cargo flows through the responsibility area of MBED, a special attention should be given to the traffic to Harasaway. Volumes of the bulk liquid cargoes delivered to the port are rather large, while the specific features of local conditions make the unloading operations very difficult to do, usually at very fresh weathers (strong winds and currents, waves, etc.). The ships often have to sharply interrupt the discharge and go to sea to wait better weather. Because of low air temperatures, the fuel is crystallizing and plugs the pipes, so that they should be dismantled for cleaning up. In these circumstances the fuel is usually lost. The probability of accidents is then very high. The Harasaway is an area of

the highest risk of oil outflows and needs due attention in planning the OSCP operations.

The cargo traffic to Hatanga is performed by large dwt ships which transship their cargoes to smaller ships in the Hatanga Bay often in heavy ice. Therefore an accident associated with oil spillage becomes very probable here.

The heavy fuel oil outflows are very likely where and when the bunker is transferred in points along the NSR in October to May. The outflows are probable as a result of ship accidents (collision, stranding, etc.) or of accidents on artificial constructions for exploration and production of oil on the shelf. The place of accident can not be foreseen. Zones of the highest risk of oil outflows from ships or artificial constructions exploited within territorial waters can be purposely plotted on a schematic map. A particular attention should be paid to the quickly developed oil fields SHTOKMANOWSKOYE and PRIAZLOMNOYE.

7 Probable oil spill from a damaged ship in the NSR and behaviour of spilled oil on the sea surface

Materials for this section of the OSCP plan for the NSR should be taken from the project II.6.2 "Ecological requirements to ships sailing by the NSR", from reports of 1993 and 1994, and from the projects 1.5.4 "Fate and characteristics of spilled oil", 1.5.6 "Preliminary investigations of behavior and spreading of oil in ice conditions" and II.6.0 "Ecological safety of shipping in ice-infested waters".

8 Vulnerability to oil of ecologically valuable areas along the NSR

As initial materials for preparing such a section of the plan, one should use the data from projects II.4 and II.5 which are devoted to preparation of original data for "Ecological Atlas"

9. Equipment for dealing with oil spills along the NSR

While establishing the Maritime Pollution Control and salvage Administration, the State made large purchases of technical equipment and floating facilities for OSCP, which were distributed among sea basins. As to the NSR, places for disposition of the oil spill combating equipment were chosen in the base ports of Murmansk and Nahodka. On account of the great extension of the response areas , parts of equipment intended for the FEBED and for the MBED were arranged in Pevek and Dikson accordingly.

According to the Russian legislation, no potential polluters (oil production rigs, naval fleet, fishing fleet, etc.) are exempted from a duty of having their own technical means for the OSCP and for preventing pollution.

In the immediate area of the NSR, in Pevek, there are two sets of boom RO-BOOM in amount of 1000 m, the RO-CLEAN system for washing the booms and a set of transferring pumps FRAMO TK-5/TK-8. A main body of the technical means is located in the ports of Murmansk and Nahodka (Table 1) and is in possession of MBED and FEBED.

Table 1

Technical means for combating the oil spills

Item Nos.	Description	Amt	Specifications	Note
1	Emergency oil pumping system FRAMO	2	1st container: Weight 2200 kg Dim. 2400 x 1300 x 1850 2nd container: Weight 1100 kg Dim. 2500 x 1750 x 1800 3rd container: Weight 2000 kg Dim. 2800 x 2260 x 1800 Capacity of pumps: TK-8 up to 1000 m^3/hr TK-5 up to 450 m^3/hr	
2	Skimmer VALOSEP W-2	2	Capacity 45 m^3/hr Power plant: Weight 1100 kg Dim. 1650 x 1100 x 1065 Skimmer: Weight 400 kg Dim. 2000 x 2000 x 1900	
3	Skimmer DESMI-250	2	Capacity 70 m^3/hr Container: Weight 3145 kg Dim. 2440 x 2900 x 2440	
4	Skimmer TRANSREC-250	1	Capacity 45 m^3/hr Power plant: Weight 1900 kg Dim. 2300 x 920 x 1650	

Item Nos.	Description	Amt	Specifications	Note
			Hoisting winch: Weight 7200 kg Dim. 2500 x 1915 x 2800 Skimmer: Weight 410 kg	
5	Skimmer FOXTAIL VAB 2-6	1	Capacity 9 m^3/hr Container: Weight 475 kg Dim. 2100 x 1400 x 1400 Power plant: Weight 585 kg Dim. 1500 x 800 x 1100	
6	Skimmer FOXTAIL VAB 4-9	1	Capacity 30 m^3/hr Container: Weight 750 kg Dim. 2250 x 1950 x 1700	
7	Submersible electric pump FLUGHT	2	Capacity 100 m^3/hr Weight 48 kg Dim. 415 x 335 x 505	
8	Suspended boom trap RO-SWEEP	1	Stationary onboard unit. Effective performance at waves under 3 m Weight 980 kg Length 35 m	
9	Oil sweeper PL-1000	1	Breadth of opening 26 m Effective performance at waves under 3 m Hose drum: Weight 750 kg Dim. 2250 x 1950 x 1700 Length 1000 m (4 x 250)	
10	Boom OCEAN-2000	2	1st container: Weight 6400 kg Dim. 2800 x 2200 x 2200 2nd container: Weight 6400 kg Dim. 2800 x 2250 x 2200	

Item Nos.	Description	Amt	Specifications	Note
			3rd container: Weight 2300 kg Dim. 2800 x 2200 x 2200	
11	Boom EXPANDEE	1	Length 432 m Weight 2700 kg Dim. 1900 x 1900 x 1700	
12	Washing unit RO-CLEAN	1	Washing of boom on transportation frame. Weight 4850 kg Dim. 5200 x 2500 x 2400	
13	Separation tank RO-SET	1	With pneumatic pump and power plant Weight 2700 kg Dim. 4700 x 2440 x 2400	
14	Inflatable boat ACHILLES	2	Carrying capacity 3210 kg Weight 360 kg Dim. 4800 x 210	
15	Outboard motor TOHATSU	2	Power 40 HP Weight 60 kg	
16	Boat MOB-20	1	Engine power 174 HP Carrying capacity 3075 t Crew up to 9 men Max passenger capacity 22 men Weight 2400 kg Dim. 6250 x 2600 x 2280	
17	Boom, type RO-BOOM, for spill containment and collection of oil from sea surface	2	Length 2 x 250 m Height 2,0 m Wind velocity up to 20 m/s Wave height up to 3 m Towing speed up to 1 knot Air temperature from -40^0 to +60^{0}C Two containers with booms on hydraulic winches: Weight 6400 kg Dim. 2800 x 2200 x 2200	

Item Nos.	Description	Amt	Specifications	Note
			Container with power plant, wire cables, etc.: Weight 2300 kg Dim. 2800 x 2200 x 2200	
18	Boom, type HF-11, for spill containment and collection of oil from sea surface	1	Length 2 x 200 m Height 4,0 m Wind velocity up to 12 m/s Wave height up to 6 m Towing speed up to 1,5 knots Air temperature from -20⁰ to +70⁰C Hydraulic winch with booms: Weight 14400 kg Dim. 3900 x 3300 x 4100 Container with buoys and rig: Weight 1300 kg Dim. 1900 x 1500 x 1400	Power unit for winch is required. The unit from pump system FRAMO fits.
19	Boom, type KL-8D, for spill containment and collection of oil from sea surface		Length 2 x 200 m, joined Total height 3,35 m Wind velocity up to 10 m/s Wave height up to 5 m Towing speed up to 1,5 knots Air temperature from -20⁰ to +70⁰C Hydraulic winch with booms: Weight 8500 kg Dim. 3700 x 3300 x 3930 Container with buoys and rig: Weight 5000 kg Dim. 2440 x 2300 x 2250 Container with compressor: Weight 1300 kg Dim. 1900 x 1500 x 1400	Power unit is required for winch. The unit from pump system FRAMO or ORS-1000 fits.
20	FRAMO system for pumping oil from tanks	2	Capacity: Submersible pump TK-5: 180 m³/hr at head of 70 m Submersible pump TK-8: 700 m³/hr at head of 31 m Container with pumps TK-5	

Item Nos.	Description	Amt	Specifications	Note
			(2 pieces) and TK-8 (1 piece): Weight 110 kg Dim. 2500 x 1750 x 1800 Container with hoses: Weight 1600 kg Dim. 2800 x 2260 x 1800	
21	Oil sweeper PL-1000/35 with guide boom HF-11 for collecting oil from sea surface	1	Working length 35 m Total height 2,2 m Sweeping width 25 m Angle of opening angle 35 deg. Guide boom length 20 m Wind velocity up to 12 m/s Wave height up to 3 m Towing speed up to 1,5 knots Air temperature from -20^0 to +70^{0}C Hydraulic winch with coiled sweeper and boom: Weight 6800 kg Dim. 3700 x 2750 x 3530	Power unit for winch and compressor for inflating HF-11 boom are required.
22	Onboard mounted oil-collecting system RO-SWEEP for collection of oil from sea surface	1	Total boom height 2,0 m Sweeping width from both side 2 x 15 m Wind velocity up to 20 m/s Wave height up to 3 m Pay-out speed up to 1,0 knot Air temperature from -40^0 to +60^{0}C Hydraulic winch with coiled sweepers: Weight 2800 kg Dim. 2700 x 2000 x 1800 Two arms with floats in a box: Weight 1600 kg Dim. 5200 x 1600 x 1200 Compressor with hydraulic drive in a box: Weight 100 kg Dim. 900 x 700 x 700	Power unit to drive winch and compressor are required. The unit from DESMI-250 fits.

Item Nos.	Description	Amt	Specifications	Note
23	System DESMI-250 for collecting and pumping oil from sea surface	4	Capacity up to 60 t/hr Wind velocity up to 20 m/s Wave height up to 3 m Pay-out speed up to 1,5 knots Air temperature from -40⁰ to +60⁰C The set consists of: hydrocompressor with hydraulic drive, collecting head, hoses, portable control unit, packed up in a special container: Weight 3000 kg Dim. 3000 x 2440 x 2440	
24	System TRANSPEC for collecting and pumping oil from sea surface	1	Capacity up to 250 m³/hr Wind velocity up to 20 m/s Wave height up to 3 m Pay-out speed up to 2 knots Air temperature from -20⁰ to +50⁰C Standard container of 20 ft with built-in hydraulic crane, drum with hose, collecting head and diesel-hydraulic compressor: Weight 3000 kg Dim. 3000 x 2440 x 2440	
25	System VALOSEP-1 for collecting and pumping oil from sea surface	2	Capacity up to 40 m³/hr Wind velocity up to 15 m/s Wave height up to 3 m Pay-out speed up to 1,5 knots Air temperature from -20⁰ to +50⁰C The system includes: Collecting head Weight 100 kg Dim. 1410 x 1100 x 870 Power unit Weight 600 kg Dim. 1650 x 1100 x 1000	
26	System VALOSEP-2 for collecting and pumping oil from sea surface		Capacity up to 45 m³/hr Wind velocity up to 15 m/s Wave height up to 3 m Pay-out speed up to 1,5 knots	

Item Nos.	Description	Amt	Specifications	Note
			Air temperature from -20⁰ to +50⁰C The system includes: Collecting head Weight 400 kg Dim. 2000 x 2000 x 1900 Hoses 100 kg Power unit Weight , 900 kg Dim. 1650 x 1100 x 1000	
27	Oil-collecting system FOXTAIL 2-6	1	Capacity 9 m³/hr 2 absorbing arms Arm length 10 m Containers for storing skimmer: Weight 475 kg Dim. 2000 x 1250 x 1075	
28	Sprayer for dispersant URD-2	2	Dispersant is fed into URD-2 from barrels	Based on s/s IRBIS
29	System RO-CLEAN for washing of booms	1		

10. Water craft and specialized fleet used in oil spill emergency

To ensure the operations of the OSCP technical means and to pursue the collection of the spilled oil, in the northern basin there are rescue tugs, specialized ships and some other water craft equipped with water-draining, oil-pumping and oil-collecting units, aids for containment of spilled oil, and some other accessory equipment.

Table 2

Inventory of water craft and aircraft for primary actions on combating oil spills at sea

Item Nos.	Description and type	Major specifications	Owner, location	Amt
1	Specialized ship (project V-92)	Length 81,16 m Width 15,3 m Hull height 7,2 m	FEBED Peter the Great Bay	1

Item Nos.	Description and type	Major specifications	Owner, location	Amt
		Draft 4,75 m Power 2 x 3600 HP Speed 15,0 knots Pull at hook 82 t Gear: stern boom 12,5 t Outboard overhang of boom 5,0 m 2-4 blade controllable-pitch propeller Bow thruster Navigation area unlimited		
2	Sea diving boat (project 535 M)	Length 41,0 m Width 8,0 m Hull height 3,6 m Draft 2,1 m Power 2 x 300 HP Speed 12,0 knots Pull at hook 5 t Gear: stern boom 2,5 t Outboard overhang of boom 5,0 m 2-4 blade controllable-pitch propeller Bow thruster Navigation area limited, under 200 miles from refuge base	FEBED pt Vladivostok	1
3	Ocean-going rescue ship (project 1453)	Length 92,8 m Width 15,62 m Hull height 7,7 m Draft 5,9 m Power 2 x 4500 HP Speed 18,7 knots Pull at hook 98 t Gear: bow booms 2 x 2 t 2-4 blade controllable-pitch propeller Bow thruster Navigation area unlimited	FEBED	1

Item Nos.	Description and type	Major specifications	Owner, location	Amt
4	Rescue tug (project 1454	Length 58,3 m Width 12,6 m Hull height 5,9 m Draft 4,7 m Power 2 x 1500 HP Speed 12,5 knots Pull at hook 3,7 t Gear: stern boom 5,0 t Outboard overhang of boom 5,0 m 1-4 blade controllable-pitch propeller Bow thruster Navigation area unlimited	FEBED pt Vladivostok AC DALRYBA pt Vladivostok Kam BED pt Petropavlovsk- Kamchatski	1 1 1
5	Rescue tug STROPTIVIY (project 1124)	Length 74,41 m Width 18,32 m Hull height 9,02 m Draft 6,7 m Power 2 x 2868 kW Speed 15,0 knots Gear: two 3t cranes, two 5t cranes Outboard overhang of boom 5,0 m 2-4 blade controllable-pitch propeller Navigation area unlimited	JSC DALRYBA pt Vladivostok	3
6	M/s UMKA	Staff ship. Sweeping and collection of oil by sweeper, booms and skimmer. Pumping of oil from damaged ships	MBED pt Murmansk	
7	M/s SVETLOMOR	Boom deployment, sweeping of oil spills, reception of collected oil from other ships. Pumping of oil from damaged ship. Collection of oil. Provision of operations of smaller craft.	MBED pt Murmansk	
8	M/s MARKAB	Fast boom deployer	MBED pt Murmansk	
9	S/s AGAT	Transportation of OSC tech. facilities, working in order, towing of non-self-propelled oil skimmers.	MBED pt Murmansk	

Item Nos.	Description and type	Major specifications	Owner, location	Amt
10	Rescue tug, type DIOKL (Holland)	Length 72,5 m Width 13,6 m Hull height 7,2 m Draft 5,96 m Power 2 x 2500 kW Speed 16,3 knots Gear: one 5t crane 1-4 blade controllable-pitch propeller Navigation area unlimited	JSC DALRYBA pt Vladivostok	1
11	Transport ship	Cargo gear 10 t and more	FEMSC pt Vladivostok, pt Nahodka AMSC pt Tiksi	
12	Transport ship	Cargo gear 40 t and more	FEMSC pt Anadyr pt Pevek pt Tiksi	 1 1 1
13	Self-propelled barge with bow ramp SLAVY-ANKA (project 20150)	Length 21,9 m Width 5,8 m Hull height 1,5 m Draft 1,1 m Power 2 x 235 HP Pull at hook 4,0 t Speed 9,5 knots 1-4 blade fixed-pitch propeller Navigation area limited, under 5 miles from a safely ship	Marine commer-cial pt Anadyr Marine commer-cial pt Providenye pt Pevek AMSC pt Tiksi	1 1 1
14	Tanker, type PARTIZANSK	Tonnage 1500 t Loaded draft 4,8 m Speed 13,2 knots Gear: two booms x 0,65 t Navigation area unlimited	PMSC pt Nahodka	2
15	Tanker, type VENTSPILS	Tonnage 4500 t Loaded draft 6,1 m Light draft 4,35 m	PMSC pt Nahodka	1

Item Nos.	Description and type	Major specifications	Owner, location	Amt
		Speed 14,3 knots Gear: hydraulic crane 1 t Navigation area unlimited		
16	Tanker, type SAMOTLOR	Tonnage 16000 t Loaded draft 9,2 m Speed 15,7 knots Gear: 4 booms x 5 t Navigation area unlimited	PMSC pt Nahodka	1
17	Tanker, (project 1577)	Tonnage 5000 t Loaded draft 3,6 m Navigation area: pt Tiksi to Yana R. mouth, under 50 miles from points of refuge	LORSC pt Tiksi	1
18	Tanker, (project P77)	Tonnage 2150 t Loaded draft 2,5 m Navigation area: pt Tiksi to Kolyma R. mouth	LORSC pt Tiksi	1
19	Cargo airplane IL-76	Cargo capacity: 40 t in range under 3000 km, 22 t in range under 5000 km Size of cargo space 18,5 x 3,25 x 3,15 Cargo-handling system: electric hoists 4 x 2,5 t Flight speed 900 km/hr	Regional UVT of Magadan City	2
20	Airplane AN-12	Cargo compartment: Length 13,5 m Width 3,0 m Height 2,4 m Cargo hatch: Width 2,95 m Height 2,4 m Cargo winch lifting capacity 2,0 t Cargo carrying capacity 10,0 t Speed 550 km/hr 10t load in range of 2200 km	Vladivostok Habarovsk Regional UVT of Magadan City	1 1 1

Item Nos.	Description and type	Major specifications	Owner, location	Amt
21	Transport helicopter, type RF-32	Weight on outer suspension up to 5,0 t Flight speed 230 km/hr Max flight range 800 km Max flight time 4,5 hrs Landing on solid ground on a spot 50 x 50 m in any area of Scheme 1 Refuelling points: Ternei, Dalnegorsk, Kovalevo, Artem	United aviation detachment of Vladivostok, Artem City	2
22	Transport helicopter, type MI-8	Weight on outer suspension up to 3,0 t Flight speed 200 km/hr Max flight range 600 km Max flight time 4,0 hrs Landing on solid ground on a spot 50 x 50 m in any area of Scheme 1 Refuelling points: Ternei, Dalnegorsk, Kovalevo, Artem	United aviation detachment of Vladivostok, Artem City	3
23	TBS, type NEFTEGAS	Delivery of OSC facilities, working in order	PO Arctikmornefte-gasrazvedka	4
24	SB-523; SB-38	Universal OSC ship, working in order	Vladivostok	2
25	S/s KARABAH	Provision of OPE operations	Vladivostok	1
26	S/s PURGA	Provision of OPE operations	Assosiation SEVRYBA	4
27	Tanker	Reserve for reception and transportation of collected oil	Assosiation SEVRYBA	

11. Delivery of technical means to a place of accident

In the North the only mode of delivery of the OSC technical means from their bases to a place of an accident is aircraft carrying the equipment to the base airports of Tiksi, Dikson and Pevek. From these airports the equipment may be transported to the place of an accident by sea. Therefore, in developing the plan, one should make provisions for containerization of the oil spill combating equipment and its delivery from an airport to a seaport and transportation by sea to a spill spot. The same mode of transportation is applicable to personnel servicing the

technical means. If the high risk zones are in proximity to the state boundary, one should also consider the mode of delivery of the OSC means from neighbour countries in case they should help in combating the oil spill.

12. Financial matters of the oil pollution emergency

In the Arctic, on the NSR, the same world-wide accepted principle is applied: the polluter compensates for pollution damage. The oil spill combating organization presents an account on the polluter for the work done. If the polluter refuses to pay the account or argues against the amount to be paid, the dispute is settled through the court. Therefore, it is very important to make provisions in the plan for the counter pollution work to be recorded as only documentary evidenced costs are recognized by the court, but those indirectly estimated are rejected. Besides these payments, the polluter should pay a penalty for environmental damage. The penalty is collected by territorial authorities of the Ministry of Nature and then transferred to ecological funds (marine territorial or federal funds). However the clean-up operator is often insufficiently funded to begin work as he should pay the services of cooperating organizations, the fuel, power and food for the personnel involved in the OSCP. For these purposes he needs some initial funds, but as these could be provided from territorial or federal ecological funds, the problem should be decided at the stage of preparing the plan. Also the case of the insolvency of a polluter should be taken into account, as the clean-up costs will have to be compensated then from ecological funds.

Conclusions and proposals

1. A concept of the oil pollution emergency plan for the NSR has been developed.
2. Inventory of numbers and types of the technical and water craft available for the OSCP operations has been compiled.
3. Sources of information needed for the plan have been identified.
4. On the basis of the investigations made, the next step should be the development of the OSCP plan for the NSR in conformity with cooperating and controlling organizations.

Authors Addresses

Project II.6.5. Coastal pollution emergency plan.

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Appendix A

Comments on Project II.6.5: Coastal pollution emergency plan.

Review and Comment
on INSROP Report April 1996

II.6.5: Coastal pollution emergency plan.

The authors used the IMO guidelines for Emergency preparedness to describe a concept contingency plan for the Northern Sea Route (NSR). The project scope is covered with the inclusion of an inventory of clean-up and related material along the NSR.

An Operational Management Staff (OMS) group as proposed, seems a good idea to exercise the contingency plan although it is not clear what authority it will have to coordinate the many other agencies that are necessary involved in the process.

Description of the geographical area in question, and location of the equipment would be better understood by including a map.

The report is short on analyses, particularly on topics of description of high risk areas and on sufficiency of contingency equipment. On the other hand, the inventory of equipment is clear and comprehensive. Few aircraft are listed as available for movement of equipment.

The funding issues, essential for growth are deserving of more in-depth study and development of options. There's no discussion on dealing with mystery spills, and reporting procedures could be elaborated to the extent of shore based transmission.

There's little reference to international linkages. The AEPS and especially the EPPR working group can provide a source of material and the basis for additional outside co-operation in case of emergencies.

The report provides an overview of the present situation and the basis for further analysis in implementing affective contingency plans in the NSR.

Reviewer:
V.M.Santos-Pedro

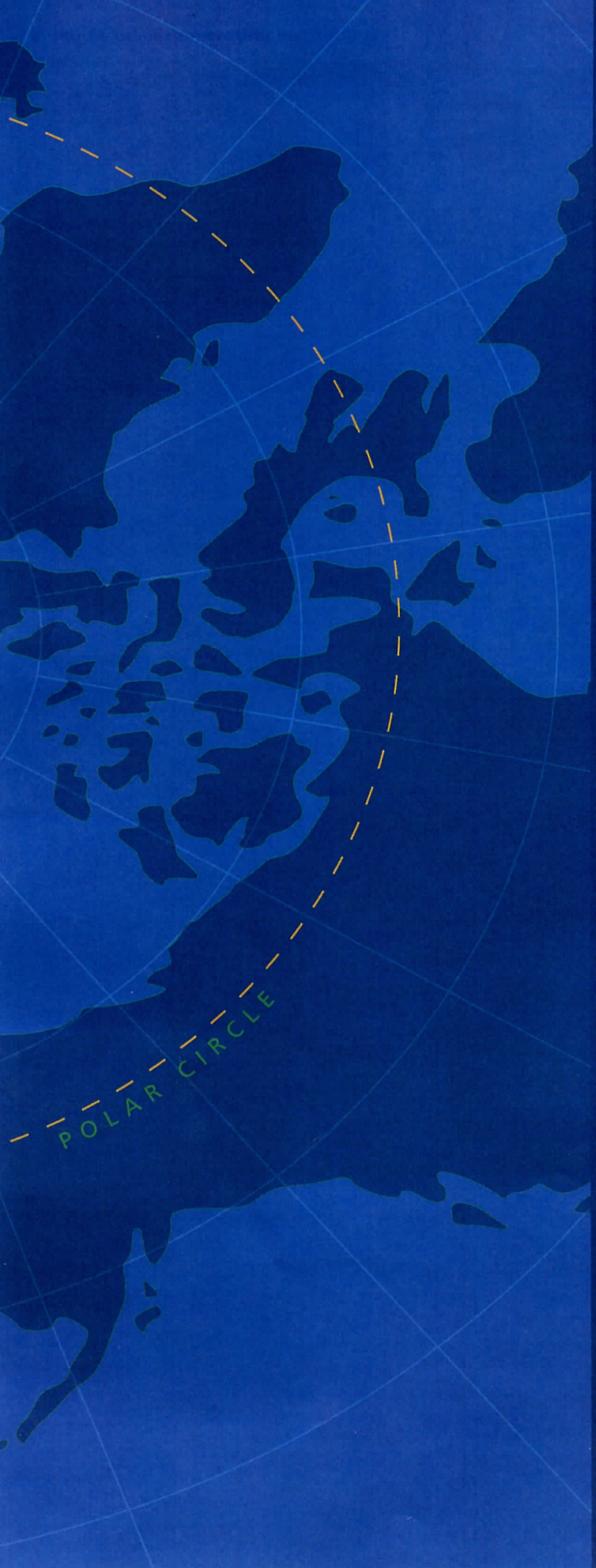
Appendix B

Comments on INSROP's Reviewes

II.6.5: Coastal pollution emergency plan.

The revised report is the first step of developing "The NSR contingency plan". The aim of the report was to present the concept of the plan, that is why it does not contain the detailed information about the location of combating equipments, description of high risk areas, in- depth study of funding issues, discussion on dealing with mystery spills and reporting procedures. All this issues will be discussed more detailed in the second step of project.

Supervisor of project II.6.5
Dr. G.Semanov



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.