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SIGNIFICANT ACTIVITIES ON THE NORTHERN SEA ROUTE  
1954-58

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FOREWORD

This report analyzes recent developments in maritime transportation along the Soviet Northern Sea Route. Every year since 1954, abnormal weather conditions have disrupted shipping schedules, and operating officials have complained that the ice conditions in the Arctic were "the worst in history." Unfavorable conditions have prevailed in different sectors each year, however, often permitting the successes of one sector to offset the reverses of the other. These reverses have resulted simultaneously in certain reorganizations, new approaches in shipping techniques, and increased scientific research -- all aimed at improving, not abandoning, navigation in the Arctic.

Figures presented in this report for the 1958 season are provisional end-of-season estimates and are expected to be revised upward when complete data are available.

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SIGNIFICANT ACTIVITIES ON THE NORTHERN SEA ROUTE\*  
1954-58

Summary and Conclusions

The Soviet Northern Sea Route is important to the USSR because it serves as a primary supply line to economic and military installations in an area which otherwise cannot be supplied adequately and because it is the only exclusively Soviet passage for transferring naval and merchant vessels from the Western USSR to the Soviet and Chinese Communist Far East. In recent years the successful completion of both these functions has been complicated by unusually adverse weather conditions. Naval and merchant convoys have been turned back from their original destinations or have been forced to winter at various Arctic locations, and vital cargoes for some areas were never delivered.

Since 1954 a series of measures has been undertaken to prevent recurrence of these mishaps. Of primary importance is the accelerated construction and acquisition of a large number of icebreakers and icebreaker-type ships to supplement and modernize an icebreaker fleet already considered the world's largest. In addition, Arctic hydrographic and meteorological research has been expanded to concentrate on long-range weather forecasts which can be used as a basis for an effective preseasonal distribution of ships and cargoes. This redistribution of ships and cargoes, practiced to some extent since 1957, has been primarily responsible for the annual increases in over-all tonnage turnover which have been accomplished in spite of adverse weather conditions.

Details available on the composition and flow of cargoes handled during a navigation season indicate that the Northern Sea Route as a maritime operation contributes little to the economy of the rest of the USSR. Most cargoes hauled by oceangoing ships are carried into or between Arctic ports. In 1958, fewer ships carried more cargo than ever before, pointing up a more extensive and efficient use of vessels in the more favorable Eastern areas. Even so, the fact that so many ships are employed for the transportation of limited amounts of cargo to relatively unproductive locations indicates not only the urgency with which this operation must be completed but also the importance attached to it by the USSR. When the comparatively limited cargo turnover and the proportionately large number of ships and gross tonnage required to carry it are considered in conjunction with the expanded research and icebreaker programs, which purportedly have been undertaken to guarantee the delivery of these cargoes, the Northern Sea Route navigation season would appear to be an expense to the USSR disproportionate to any calculable economic returns. It must be concluded, therefore, that the USSR attaches an importance to the current and potential use of this route without regard for operating costs and that its principal function is primarily strategic, not economic.

\* The estimates and conclusions in this report represent the best judgment of this Office as of 1 January 1959.

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I. Introduction.

The Northern Sea Route, a transportation lane usually identified as extending for approximately 3,500 miles from the Kara Sea in the West to the Bering Strait in the East, is the primary supply line for economic installations and military bases in the Soviet Arctic which cannot be served adequately by other means of transport. It is the shortest, and the only Soviet-controlled, route by which the USSR can transfer ships or cargoes to the Far East. Shipping activities on this route can be carried out only during a 3-month navigation season which normally extends from mid-July to mid-October. These shipping operations are directed by officials of the Chief Directorate of the Northern Sea Route (Glavnoye upravleniye Severnogo Morskogo Puti -- GUSMP), which is subordinate to the Ministry of the Merchant Fleet (MINMORFLOT).

The route is divided into two major operating sectors: the Western, which extends from the Kara Gate to Proliv (Strait) Vil'kitskogo, and the Eastern, which extends from Proliv Vil'kitskogo to the Bering Strait. An area sometimes described as the Central Arctic extends from Proliv Vil'kitskogo to Proliv Longa (see the map, Figure 1\*). Most ships usually operate within or between the Eastern and Western Sectors. A few ships do, however, traverse the entire route in either one or both directions.

Since 1956, maritime operations on the route have been hampered by increasingly severe ice conditions in Proliv Longa and Proliv Vil'kitskogo, with the result that during the past three shipping seasons essential cargoes were not delivered to some locations, transfer schedules were disrupted, and large numbers of merchant and naval vessels were forced to winter in the Arctic for the first time since 1937.

A. Administration of the Northern Sea Route.

All maritime operations on the Northern Sea Route are controlled by GUSMP of the Ministry of the Merchant Fleet.\*\* Until 1957 this directorate owned, in addition to Arctic construction, supply, scientific, and aviation organizations, two steamship agencies\*\*\* which controlled approximately 23 icebreakers, 35 cargo ships, and an undetermined number of hydrographic vessels. Other ships which operated on the route are chartered from other Soviet and from Western steamship agencies for the duration of the season.

The movements of all ships, including the naval convoy, are controlled while on the route by two regional directors whose western and eastern headquarters for the season are at Dikson and Pevék, respectively. Additional control is exercised by GUSMP authorities at Moscow, who fly to Arctic locations if emergencies arise and require

\* Inside back cover.

\*\* For a brief history of the organization and functions of GUSMP, see Appendix A.

\*\*\* The Murmansk Arctic Steamship Agency was made directly subordinate to the Ministry of the Merchant Fleet and the Vladivostok Arctic Steamship Agency was merged with the Far East Steamship Agency.



their presence. Aerial ice reconnaissance and meteorological forecasting are the responsibilities of GUSMP organizations throughout the year.

After the reversals encountered during the 1956 navigation season (the first year since 1937 that ships were forced to winter on the route), major changes were effected within GUSMP for the purposes of improving future shipping operations in the Arctic. The two steamship companies, together with personnel and some ships, were merged with other Soviet shipping organizations. The disposition of the icebreaker fleet and the hydrographic ships is not known.

Another change was the replacement of Admiral V. F. Burkhanov, head of GUSMP since 1952, by A. A. Afanase'yev, a deputy minister of the Ministry of the Merchant Fleet. Burkhanov, however, remained as deputy to Afanese'yev, and continued to direct operations. His "demotion" may have been a face-saving device in retribution for the 1956 navigation difficulties.

The shift in the allocation of responsibilities for Arctic maritime operations probably was made with the intention of narrowing GUSMP's responsibilities, thus freeing the directorate for tasks associated primarily with the exploration and development of improved sea routes. Except for the loss of its steamship agencies, however, GUSMP has controlled operations as usual. The disposition of cargoes and ships appears to have been more efficiently handled, but bickering among port, steamship, and GUSMP officials continued to arise.

It is difficult to assess the validity of accusations which the Soviet press directs against GUSMP. This organization, although nominally subordinate to the Ministry of the Merchant Fleet, appears to have maintained independent and autonomous authority in almost every phase of Arctic activity, even after having been relieved of some of its functions. This supremacy undoubtedly has aggravated other officials in the Ministry of the Merchant Fleet and other Arctic organizations whose ships and cargoes sometimes enjoy less than top priority. It is the comments of these officials which are echoed in the Soviet press. There has been little evidence, however, that the directorate has suffered any real loss of prestige.

#### B. Weather Conditions.

The ice which is present almost the year around along the Northern Sea Route is not completely eliminated even during the summer months. Of all the seas which border the Arctic mainland, only the Barents Sea comes under the influence of warm currents and is open to navigation throughout the year. In the Kara Sea, where the Northern Sea Route is considered to begin, navigation is possible only from July to the end of September or to mid-October.

Farther eastward the Laptev and East Siberian Seas are open from July through October, and the Chuckchi Sea and Bering Strait sometimes are navigable from mid-June to mid-November. Because of

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the icebound areas in Proliv Vil'kitskogo and in Proliv Longa, however, oceangoing ships do not operate into any of the above-mentioned areas before mid-July or after September. When unfavorable weather conditions exist in these straits, convoys of ships under icebreaker escort are sometimes held up for 6 weeks beyond the normal opening periods before they can move through them.

This situation exists because the permanent ice pack, which extends from the North Pole southward, comes closest to the Arctic mainland in these two strait areas (see the map, Figure 2\*). If prevailing winds push the permanent ice pack toward the mainland, the straits become blocked even during the summer months, and passage through them becomes impossible.

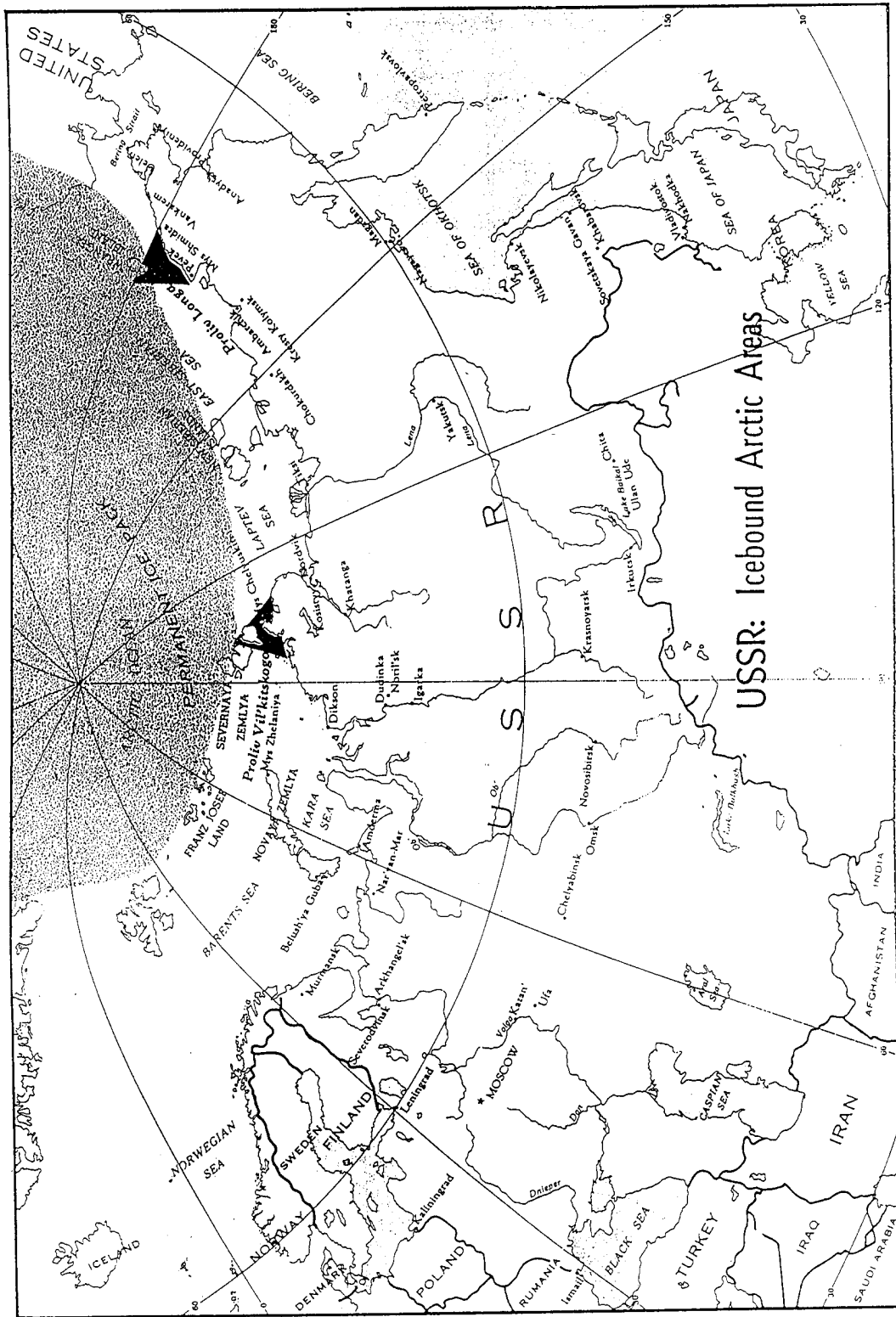
Weather conditions such as these brought about some or all of the unfavorable results during each of the navigation seasons since 1956 as follows: (1) convoys of merchant and naval ships scheduled to cross the route were forced to turn back to home ports; (2) merchant and naval ships, which were unable to make timely departures from the route, were forced to winter at Arctic locations; (3) an oceangoing cargo ship was crushed by the ice pack and sank with all cargo on board; (4) most of the merchant ships which made complete crossings of the route were not scheduled to do so but transited because they were unable to return to their home ports; and (5) many cargoes coming onto the route from the Western or Far Eastern USSR were not delivered, and cargoes originating at Arctic ports were not transhipped to other Arctic ports because oceangoing ships did not arrive in time to complete schedules.

Although aerial ice reconnaissance and meteorological and hydrographic research are conducted on a vast scale in the Soviet Arctic, the severity of the ice conditions during the past 3 years was not fully anticipated. Even if it had been, however, it is doubtful that the conduct of shipping operations could have been appreciably improved. These adverse ice conditions nevertheless provided further incentive for increased Soviet emphasis on additional ice research and for the development of more flexible and economic shipping techniques on the route.

If further developed during forthcoming navigation seasons, improved long-range weather forecasting will help considerably in arranging ship schedules for full exploitation of the more favorable areas. This task is currently being developed by data obtained from aerial ice reconnaissance during the months of February through November, from the North Pole drift stations, and from automatic hydrological and meteorological stations placed on the ice pack. On an experimental basis the televising of ice conditions from reconnaissance aircraft to Arctic ships already has been carried out, and photo-facsimile apparatus for the reception of ice data have been set up at Arctic shore locations and on a limited number of icebreakers. The latter activities are expected to be conducted on a full scale in the near future.

\* Following p. 4.

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USSR: Icebound Arctic Areas

Figure 2

Expeditions also were set up in 1957 and 1958 to investigate the feasibility of using the Northern Variant, a second route which goes around northern Novaya Zemlya, and northern Severnaya Zemlya into the Laptev Sea. Explorations of this alternate route have been carried out to determine if it offers more favorable navigation conditions than exist along the mainland routes.

Another program for improving navigation in the Arctic is the expansion of the icebreaker fleet which has been in progress since 1954. The emphasis is on faster ships which can move independently -- or at least, semi-independently -- in ice. These ships have been built by the Netherlands, Finland, and the USSR. (For additional information, see Table 1. \*).

## II. Maritime Activity.

### A. Merchant Ships Employed on the Northern Sea Route.

Merchant ships of all types are engaged in cargo-carrying operations during a Northern Sea Route navigation season. Oceangoing steamships, tankers, barges, lighters, and tankers transport most of the cargo, but icebreakers, hydrographic ships, and other types also are employed for this purpose if necessary. In previous years, more than 400 ships of all types were utilized during a navigation season. In 1958, however, the number of ships utilized was reduced to 361 although more tonnage was carried than in any previous season. This reduction in the number of ships was probably the result of improvements in weather forecasting which enabled ship concentrations to be made in those Eastern Sectors which were relatively less affected by adverse ice conditions. This concentration permitted more intensive shuttling among Arctic ports and more effective utilization of cargo capacities. \*\*

#### 1. Oceangoing Steamships.

Steamships which operate on the route are of both Soviet and Western registry. The Soviet ships either are owned by GUSMP or are chartered by Arctic organizations from Soviet steamship agencies. They operate primarily within one sector and transport cargoes to and from major locations in the area. Only a small minority of these merchant ships make complete transits of the route during a season, and since 1956 most of these were unscheduled transits necessitated by bad ice conditions. \*\*\*

Approximately one-third of the oceangoing steamships operating on the route are Western vessels, chartered by the USSR to transport timber exports to non-Communist countries. Most of the Western vessels used on the route during the entire period 1954-58 were of Norwegian, West German, and British registry. Other

\* P. 8, below.

\*\* For the total number and types of merchant ships employed on the Northern Sea Route in 1954-58, see Table 6, p. 24, below.

\*\*\* For additional information on ships crossing the route, see C, below.

registries included Costa Rican, Swiss, Liberian, Panamanian, Swedish, Danish, Greek, Italian, Dutch, and Finnish.\*

2. Tankers.

Until recent years, because of a lack of large bulk petroleum depots, large tankers did not operate on the Northern Sea Route, and most petroleum products had to be transported in barrels on the cargo ships. The recent construction of bulk storage facilities for Soviet military organizations at various locations enabled larger bulk deliveries, and in 1957 and 1958 Kazbek-class tankers (estimated at 8,000 GRT), the largest and newest of the Soviet maritime fleet, were observed delivering petroleum cargoes at Arctic ports. These deliveries were not undertaken, however, until two tankers of this class had traveled during the 1955 season from the Black Sea to the Bering Sea via the Northern Sea Route without unloading. These ships later were employed in Far Eastern shipping, but the Arctic voyages may have been carried out to test the capability of this type of tanker for future operations in ice.

3. Lighters and Barges.

The most efficient conveyors of bulk cargoes between Northern Sea Route ports are large numbers of lighters and barges which are employed on oceangoing voyages and which are capable of hauling up to 3,200 metric tons of cargo. (See Figure 3.\*\*\*) The extensive use of this type of vessel in the Arctic releases larger ships for carrying more specialized cargoes, although their use is also dictated by a lack of adequate port facilities for the handling of larger ships.

In the Central Arctic these vessels transport cargoes out of the river deltas to nearby coastal locations. Their more widespread use, however, is reflected in the Western Arctic shipping traffic between Murmansk and ports of the Yenisey River. Complete information on the number and employment of lighters in this area is not available, but it is estimated that they handle at least the bulk of major cargoes (such as coal and timber) moved between Western Arctic ports during a navigation season.

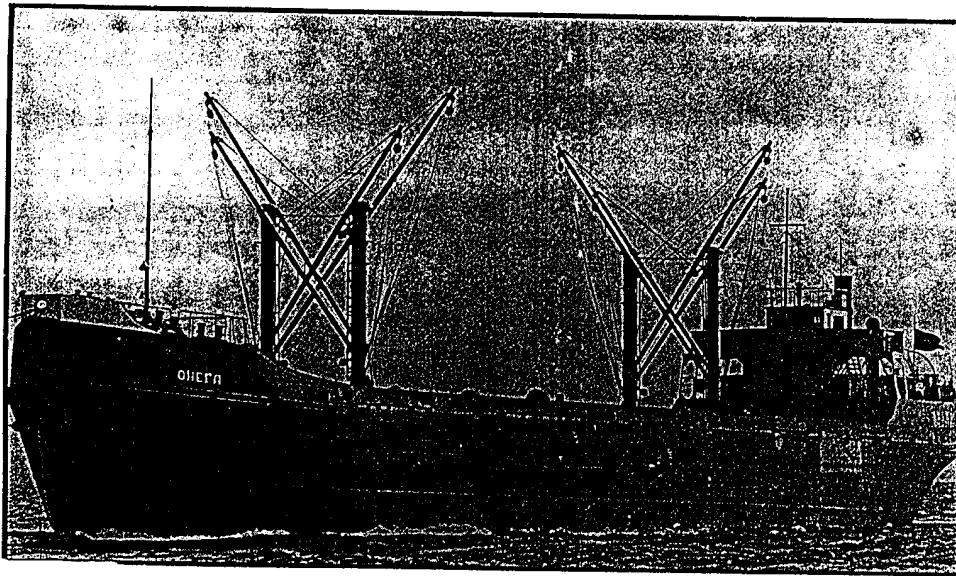
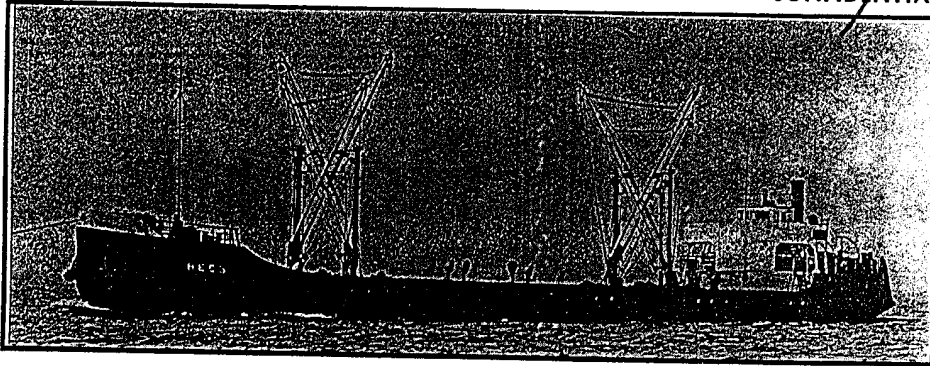
B. Icebreakers.

Under favorable conditions it is possible for cargo ships to proceed independently in the open seas of the Arctic. Movement through the difficult straits of Proliv Vil'kitskogo and Proliv Longa, however, requires icebreaker assistance. In addition to escorting cargo ships serving points along the Northern Sea Route, the icebreakers must provide safe passage for merchant and naval convoys transiting this route. They also serve as provisioning ships for supplying fuel, water, and foodstuffs when the schedules of naval and cargo vessels require this service.

\* For a tabulation of the registry, number, and tonnage of Western vessels observed on the route during the period 1954-58, see Table 7, Appendix B, p. 25, below.

\*\* Following p. 6.

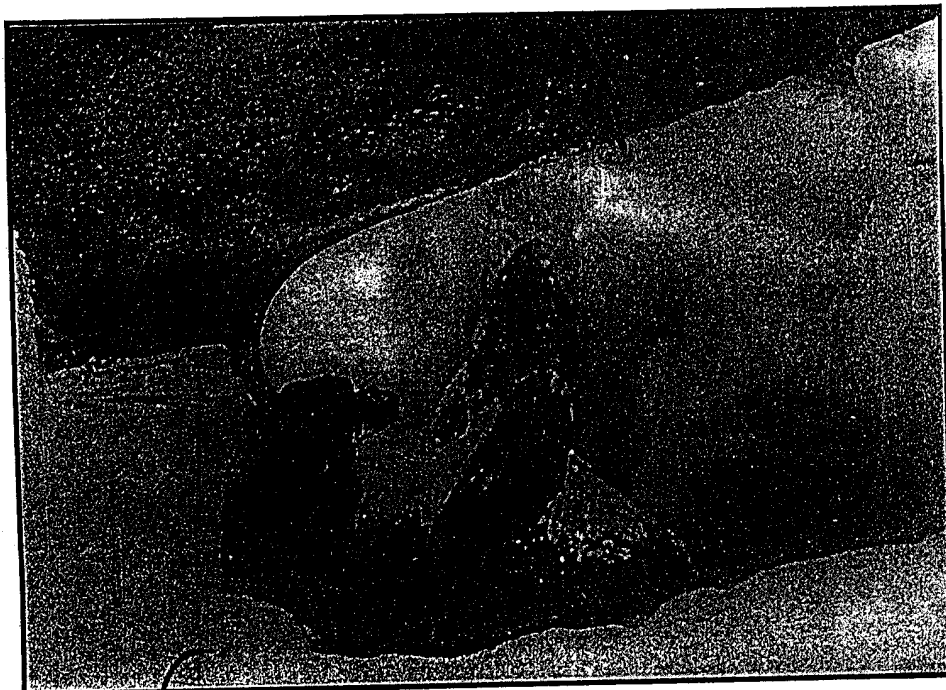
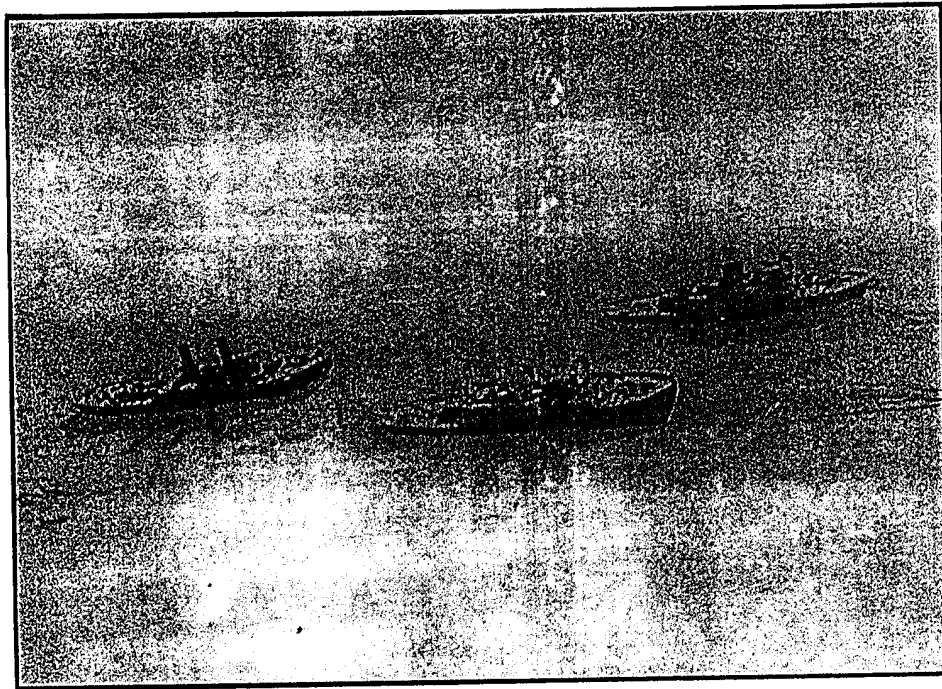
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USSR: Western Arctic Oceangoing Lighters, 1958

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Figure 3



USSR: Icebound Icebreakers, 1957 and 1958

Figure 4

GUSMP has at least 23 icebreaker-type ships at its disposal.\* During a navigation season the majority of these icebreakers are based in the Western Arctic, but when merchant and naval convoys begin to move eastward, some icebreakers escort them into the Laptev and East Siberian Seas and remain there until the season has been completed. At the end of the 1957 season, icebreakers involved in Central Arctic operations were ordered to leave the Northern Sea Route via the Far East because ice conditions in Proliv Vil'kitskogo were not favorable to their returning west. For unknown reasons, 4 icebreakers, including 2 recently purchased from Finland, remained in the area until late October and subsequently were forced to winter at Tiksi (see Figure 4\*\*).

The number of icebreakers used on the Northern Sea Route during the period 1954-58 has not increased significantly above the number used in previous years. For example, 11 icebreakers were used in 1947, and 15 in 1958. The development of the Northern Sea Route icebreaker fleet since 1954 has stressed qualitative rather than quantitative growth. The acquisition of nine new ships since that time has permitted the older pre-World War II Soviet icebreakers to enter long-term repair without affecting Arctic operations. Three of these new icebreakers were purchased from Finland, the remaining six icebreaker-cargo types from the Netherlands. Two additional icebreakers are being built currently in Finland, and the USSR plans production in its own shipyards on prototypes of the Netherlands-built icebreaker-cargo types.\*\*\* The atomic-powered Lenin, under construction at Leningrad, is scheduled to operate on the Northern Sea Route during the 1959 season, and the USSR anticipates that its features will enhance its capability for moving ships through heavy ice in future Northern Sea Route seasons. The advantages of the atomic-powered icebreaker are its increased horsepower, which will permit passage through deeper ice, and its nuclear propulsion system, which will permit the ship to remain on the route throughout the season without refueling. It is doubtful, however, that one icebreaker, despite its efficiency, can by itself favorably influence navigation under conditions which prevailed during the past three seasons.

### C. Complete Crossings.

The majority of ships which operate during a navigation season do not cross the Northern Sea Route but remain within the Eastern or Western Sectors engaged in shuttle operations between different ports. Some ships which cross, unload and load en route and eventually depart in the opposite direction from which they started. Complete crossings sometimes are scheduled, but they are more often brought about by ice conditions which force them to depart the route in the opposite

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\* Included are true icebreakers and icebreaker-cargo vessels. The USSR is believed to own a fleet of approximately 35 such large icebreakers. A few of these are controlled by the Navy. The remainder, of unknown subordination, have not been noted in recent years, but probably still exist and are in use for local harbor work.

\*\* Following p. 8.

\*\*\* For a list of recently acquired Soviet icebreakers and those scheduled to be acquired, see Table 1, p. 8, below.



Table 1  
Icebreaker-Type Vessels Delivered or Scheduled to Be Delivered to the USSR  
1954-62

Type of Vessel	Name	Country of Origin	Scheduled Year of Delivery	Gross Register Tonnage	Speed (Knots)	Number
Icebreakers	Kapitan Belousov	Finland	1954	3,710	16.5	1
	Kapitan Melekhov	Finland	1956	3,416	16.5	1
	Kapitan Voronin	Finland	1955	3,416	16.5	1
	(Bol'shoy class)	Finland	1960-62	17,000	N.A.	2
	Lenin	USSR	1959	11,500	18.0	1
Icebreaker-cargo (Diesel electric)	Angara	Netherlands	1957	7,661	14.3	1
	Baykal	Netherlands	1957	7,661	14.3	1
	Indigirka	Netherlands	1957	7,661	14.3	1
	Lena	Netherlands	1954	7,503	14.3	1
	Ob'	Netherlands	1954	7,544	14.3	1
	Yenisey	Netherlands	1954	7,503	14.3	1
	(Prototypes of above)	USSR	N.A.	N.A.	N.A.	N.A.
Ice-reinforced vessels (Diesel electric)	Angarges	USSR	1957	5,495	16.0	1
	Dneproges	USSR	1956	5,495	16.0	1
	Kuybyshevges	USSR	1957	5,495	16.0	1
	Rionges	USSR	1957	5,495	16.0	1
	Tsimlyanskges	USSR	1957	5,495	16.0	1
	Volkhovges	USSR	1956	5,495	16.0	1
	(Prototypes of above)	USSR	N.A.	N.A.	N.A.	N.A.
Total			117,545 plus			18 plus

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direction from which they started. Such conditions have been responsible for most of the merchant crossings since 1955.



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Ships which cross the route without stopping are believed to be carrying out voyages of an experimental or strategic nature. Examples of this are the annual naval convoys and, more specifically among the merchant types, the 1955 crossing of two Kazbek-class tankers which were fully loaded with Black Sea petroleum products destined for Far Eastern ports.

In evaluating past record crossings and the possibility for faster crossings in the future, several factors must be considered. Weather conditions are most important. Favorable ice and winds can increase considerably normal rates of speed, whereas unfavorable conditions can delay the movements of ships indefinitely. Other considerations are the speed capabilities of the ships involved and the actual steaming time of a ship as opposed to the total time consumed in crossing. Table 8\* contains the earliest and latest opening and closing dates for various sectors of the route, the distances between selected ports on the route, the time required to traverse these distances at average speed and fast speed, and a statement of normal ice conditions within various parts of the route.

The fastest crossings of the route in recent years have been made by Lend-Lease Liberty ships with top speeds of 13 knots: the Emel'yan Pugachev (14 days, 22 hours) and the Suchan (17 days), both in 1955, and the Sergei Kirov (19 days) in 1953.\*\* These probably were nonstop crossings.

The fastest and most efficient ships operating in the Arctic at the present time are the icebreakers and icebreaker-cargo types which are known to be capable of speeds up to 16.5 knots.\*\*\* The atomic-powered Lenin, scheduled to take part in the 1959 season, is expected to operate at a speed of 18 knots. All of these ships, apart from their capacity for operating into icebound areas, also can react more rapidly to unpredicted ice conditions. Under optimum conditions they could transit the route from the Kara Gate to the Bering Strait (approximately 3,500 miles) in less than 12 days and simultaneously provide the most rapid escort for the fastest ships which may be scheduled to cross the route.

D. Naval Convoys, 1954-58.

Soviet dependency upon the Northern Sea Route, not only as a maritime lane for the movement of merchant ships but also for the through transit of naval vessels from the Western USSR to the Far East, is evidenced by the increasingly larger naval convoys which have crossed it in recent years. At least half of the major naval units in

\* Appendix B, p. 26, below.

\*\* In 1940 the German raider Komet crossed the Northern Sea Route in 21-1/2 days under exceptionally favorable navigational conditions. The actual steaming time of the ship was 14 days.

\*\*\* The 3 Finnish-built Kapitan-class icebreakers are recorded as having speeds of 16.5 knots; the 6 Dutch-built Lena-class icebreaker-cargoes, 14.3 knots; and the 6 Soviet-built ice-reinforced GES-class, 16 knots.

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the Soviet Pacific Fleet have been transferred from the Western USSR via the Northern Sea Route, and transfers since 1955 have tripled both cruiser and submarine forces in the Pacific. The only transfers of naval vessels from West to East via another route in recent years occurred in 1957 when two destroyers and a naval tanker moved from the Black Sea via the Suez Canal and Indian Ocean to the Far East. Because of ice conditions in Proliv Vil'kitskogo, there were no completed naval crossings in 1958, and it is not known how many crossings were scheduled.

Northern Sea Route naval convoys usually depart from White Sea naval bases in mid-July. \* When a convoy enters the Kara Sea, it is placed under the operational control of GUSMP shipping authori-

While in transit across the route the naval convoy usually is divided into three groups and is under constant icebreaker escort. When the groups arrive at Provideniya, they are turned over to the operational control of the Soviet Pacific Fleet and escorted to Vladivostok and/or Petropavlovsk naval bases, where they are permanently assigned. Reliable identification of the total size and composition of the ships which cross the route is not possible unless provided by sightings, which must be carried out while the complete convoy is en route from Provideniya to Petropavlovsk. \*\*

On two occasions in recent years, some elements of the annual naval convoys were unable to complete transfers of the route. In 1956 the entire convoy reached the Pevek area, but ice conditions in Proliv Longa were unusually difficult and only 18 units reached the Pacific. At least 17 units, known as the Kama Convoy, were wintered at Kresty Kolymsk and did not complete crossings until 1957. An unknown number of ships turned back and recrossed the route to the Western USSR. In 1958, ice conditions in the Western Arctic were so severe that the naval convoy did not depart eastward from White Sea bases until mid-August. By 15 September, ice forecasts prohibited any possibility of crossing to the Pacific, and the convoy groups turned back westward from Proliv Vil'kitskogo to their White Sea departure bases.

This is the first instance since 1951 that naval units constructed in shipyards of the Western USSR were not delivered to the Soviet Pacific Fleet via the Northern Sea Route.

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\*\* For a tabulation of these sighting results since 1954, see Table 9, Appendix B, p. 28, below.

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E. Vessels Wintering on the Northern Sea Route.

In 1956, ships were forced to winter on the Arctic for the first time since an unexpected deterioration of ice conditions in Proliv Vil'kitskogo\* in 1937 prevented 42 vessels, including most of the Soviet icebreaker fleet, from reaching their final destinations.

In 1956, ice conditions were so difficult in Proliv Longa that a large number of ships crossing the route from west to east were forced to return to the Western USSR after traveling as far as Pevek. These units included seven Polish cargo ships scheduled for delivery to Communist China, Soviet cargo ships en route to Far Eastern ports, and an unknown number of Soviet naval vessels being delivered to the Soviet Pacific Fleet.

Some ships scheduled to cross the route in 1956 did not turn back and were wintered at Eastern Arctic ports. An unknown number of fishing vessels en route to Kamchatka ports were placed in demurrage at Pevek, and 17 vessels of the naval convoy wintered at Kresty Kolymsk. These latter units, unless damaged, may have been wintered for experimental purposes. In addition, one cargo ship and one tanker, operating in the Far Eastern Sector, were unable to complete cargo operations in time and wintered at Mys Shmidta.

In 1957 the severity of ice conditions shifted the bottleneck area in the Arctic to Proliv Vil'kitskogo in the West. At the end of the season, all ships located west of this strait and formerly scheduled to cross the route were either turned back to home ports or placed in demurrage. Approximately 25 fishing vessels were wintered at Dikson, and 1 tug and 2 lighters at Igarka. Ships located east of Proliv Vil'kitskogo were to depart the route via the Far East. One cargo ship and one tanker were unable to and wintered in Zaliv Khatanga. Four Western Sector icebreakers, located in the eastern approaches to the strait, had sufficient time to depart to the Far East but for unknown reasons remained in the area attempting to move westward and subsequently were forced to winter at Tiksi.

After the 1958 season, which was even more severely affected by ice conditions in Proliv Vil'kitskogo, a cargo ship and an icebreaker which had spent the previous winter in the Arctic and one hydrographic ship wintered at Tiksi. Details are not available, but this action may have been deliberate, as the ships had sufficient time to depart to the Far East. (For identification of ships which have wintered on the route since 1956, see Table 3.\*\*)

\* The wintering ships under discussion in this section are classified as "forced winterings" because of climatic conditions which prevented them from completing their scheduled return to home ports. Some smaller hydrographic ships, as well as tugs and lighters owned by local Arctic port authorities, are wintered after every season. In 1950-51, two US Lend-Lease icebreakers were wintered on the Northern Sea Route. This is believed to have been a deliberate action by the USSR to avoid redelivery to the US.

\*\* Table 3 follows on p. 13.

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Table 3

Vessels Wintering on the Northern Sea Route  
1956-58

Year	Location	Ships	Type
1956	Kresty Kolymskaya	Kama Convoy	
1956	Mys Shmidta	El'ban Voykov	Tanker Cargo vessel
1956	Pevek		Fishing vessels
1957	Dikson		Fishing vessels (25?)
1957	Igarka	Chador Kavkaz Kotuy	Tug Lighter Lighter
1957	Khatanga	Yakan Nenets	Cargo vessel Tanker
1957	Tiksi	Georgiy Sedov Kapitan Belousov Kapitan Voronin Sibiriyakov	Icebreaker - steamship Icebreaker Icebreaker Icebreaker
1958	Tiksi	Yakan Georgiy Sedov	Cargo vessel Icebreaker - steamship

It is not unusual for small ships, especially hydrographic types, to winter in the Arctic. This permits them to begin their particular functions early the following year in localized areas where the Arctic seas are navigable before the straits open. The wintering of large oceangoing vessels, however, entails heavy maintenance costs and also deprives steamship agencies of critically needed ships for operations in other areas. At most Arctic locations, extra rations of fuel, food, clothing, and ship repair equipment are not available or sufficient for the demands of wintered ships and, consequently, must be transported in by air from supply bases of the Western or Far Eastern USSR.

F. Cargo Data.

Even though the internal transshipment of some cargoes necessarily represents a duplication of individual

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figures, the totals are believed to indicate a minimum of cargo activity. Being a minimum, the figures can be used only to establish the approximate magnitude of cargo handled to, from, and between various ports on the route. (For the amount of cargo loaded and unloaded at major Arctic ports for the period 1954-58, see Table 4. \*)

Although the amount of cargo handled on the Northern Sea Route may increase each year, the composition of cargoes does not vary considerably. (For total figures on the types of cargo handled on the route during a season and statements of their distribution, see Table 5. \*\*) Coal and timber are the major products. The turnover of those two products may be considerably greater than the figures indicated in Table 4. The bulk of coal and timber transported in the Arctic is shipped by barges and oceangoing lighters. Additional timber is floated down the Yenisey and Lena Rivers in log rafts,

Approximately half of the reported timber totals are transported to non-Communist countries; a limited amount is shipped to Barents Sea ports; but the greater tonnage, probably stays on the route. Most of the coal transported also remains on the route, except for limited amounts shipped out of Nar'yan-Mar to Barents Sea ports.

There are no sources for petroleum in the Arctic; hence all products must be shipped by bulk in tankers or in barrels on cargo ships. Local requirements for petroleum at most Arctic locations are believed to exceed the limited amounts known to be unloaded during a navigation season. The major reasons for the low percentages noted in Table 4 are as follows:

1. Storage facilities for the reserve of petroleum products in the Arctic are not believed to exist on a large scale, although the construction of them has increased in recent years. This lack of storage necessitates heavy barrel shipments

2. Bulk and packaged petroleum products are transported down the Yenisey and Lena Rivers after having been shipped on the Trans-Siberian Railroad to river ports. The amounts of petroleum handled by river shipping to Arctic locations are not known.

\* Table 4 follows on p. 15.

\*\* Table 5 follows on p. 17.

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Table 4

Total Cargo Loaded and Unloaded at Major Arctic Ports  
1954-58

	Metric Tons				
	<u>1954 a/</u>	<u>1955 a/</u>	<u>1956 a/</u>	<u>1957 a/</u>	<u>1958 b/</u>
Novaya Zemlya					
Loaded		762	17	1,586	30
Unloaded	56,345	117,378	75,111	100,111	46,606
Nar'yan-Mar					
Loaded	123,305	172,840	184,536	156,353	57,209
Unloaded	2,100		5,630	6,580	1,200
Amderma					
Loaded	1,137		1,318	1,706	3,313
Unloaded	14,117	11,923	41,404	31,437	39,212
Dikson					
Loaded	5,669	3,517	8,305	16,565	10,889
Unloaded	29,107	15,136	47,549	65,409	66,908
Igarka					
Loaded	109,477	126,338	69,420	203,842	182,323
Unloaded	1,950		590	790	278
Dudinka					
Loaded	68,055	34,815	16,360	31,969	42,840
Unloaded	44,272	28,188	63,500	65,449	69,118
Khatanga					
Loaded	4,902	400	8,159	164	10
Unloaded	4,689	3,779	21,647	6,934	22,034
Tiksi					
Loaded	103,842	87,645	95,233	74,989	88,302
Unloaded	30,577	31,071	90,450	84,903	70,569
Kresty Kolymski					
Loaded			95,233	74,989	47,652 c/
Unloaded		7,718	1,341	10,134	19,726 c/

\* Footnotes for Table 4 follow on p. 16.

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Table 4

Total Cargo Loaded and Unloaded at Major Arctic Ports  
1954-58  
(Continued)

	Metric Tons				
	1954 <u>a/</u>	1955 <u>a/</u>	1956 <u>a/</u>	1957 <u>a/</u>	1958 <u>b/</u>
Pevek					
Loaded	1,186	16,094	14,155	12,711	16,423
Unloaded	133,827	137,793	48,810	125,246	227,274
Shmidta					
Loaded		1,087		1,003	1,995
Unloaded	6,860	38,127	16,737	32,549	30,461

a. 6/

b. 7/. Figures presented in this report on the 1958 season are provisional end-of-season estimates

c. Cargo figures for 1958 for Kresty Kolymsk include large totals unloaded at minor locations adjacent to Kresty Kolymsk at which little or no activity was recorded in previous years. Cargo unloaded at these minor locations was probably scheduled for ultimate delivery to Kresty Kolymsk.

It is possible that the adverse effects of weather conditions on recent shipping operations may bring about revised methods for moving cargoes into Arctic locations. This possibility already has been indicated

Cargoes to be carried for organizations in the Irkutsk sovnarkhoz will be doubled, and cargoes hauled for the Yakutsk sovnarkhoz will be increased to unstated amounts

and as a result of a 50-percent reduction in shipments from the Far East which had previously been transported overland from Magadan. 8/

These changes imply that a large percentage of cargoes previously transported into the Central Arctic by oceangoing steamships will be forwarded to Lena River ports on the Trans-Siberian Railroad and will be further transshipped to points downstream by vessels of the Lena River Steamship Agency. (For the area encompassed by the Irkutsk and Yakutsk sovnarkhozes, see the map, Figure 5. \*)

\* Following p. 16. (Text continued on p. 20.)

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Table 5

Types of Cargo Handled on the Northern Sea Route  
1957-58

Year	Cargo	Loaded (Metric Tons)	Unloaded (Metric Tons)	Total (Metric Tons)	Percent of Total Cargo Operations	Comment
1957 a/*	Coal	202, 420	211, 574	413, 994	36.4	Sources of coal on the Northern Sea Route (Vorkuta, Noril'sk, Sangary and Kolyma mines) are transferred to other ports on the Northern Sea Route or on the Barents Sea. Coal from Sakhalin and Chukotsk is also brought into the Eastern Sector.
1958 b/		164, 572	227, 330	391, 902	33.8	
1957	Oil	4, 616	52, 978	57, 594	5.1	All known petroleum shipments were imported from Batumi, Arkhangel'sk, Murmansk, and Vladivostok. This figure includes known bulk and packaged totals, but most packaged fuel is shipped on cargo ships and is not detected. The amount of fuel shipped via the Lena River to Arctic ports also is not known.
1958		7, 296	63, 833	71, 129	6.1	
1957	Timber c/	236, 516	64, 498	301, 014	26.4	Timber shipped or floated down the Lena River stays in the Eastern Sector. Timber shipped or floated down the Yenisey River is shipped to Western Sector ports, the Western USSR, or non-Communist countries.
1958		238, 650	88, 120	326, 770	28.1	

\* Footnotes for Table 5 follow on p. 19.

Table 5  
Types of Cargo Handled on the Northern Sea Route  
1957-58  
(Continued)

Year.	Cargo	Loaded (Metric Tons)	Unloaded (Metric Tons)	Total (Metric Tons)	Percent of Total Cargo Operations	Comment
1957	Miscellaneous	26,956 d/ 61,748	155,866 309,603	182,822 371,351	16.0 32.0	This cargo consists of food, clothing, construction materials, technical equipment, empty barrels, and scrap metal. The empty barrels and scrap metal are shipped out of all ports on the Northern Sea Route to Far Eastern or Western USSR for refilling or re-processing. Other cargoes are shipped into all Western Sector ports from Western USSR ports and into the Eastern Sector from Far Eastern ports. Additional shipments are made via the Trans-Siberian Railroad to Lena River ports, and then down the river to Tiksi for further transshipment to other Eastern Sector ports.
1958 e/						
1957	Ore	7,266		7,266	0.6	Ore, probably tin and bauxite, is shipped out of Tiksi and Pevek to Nakhodka.
1958 e/						
1957	Unidentified	43,195	133,212	176,407	15.5	
1958 e/						
1957	Total	520,969	618,128	1,139,097		
1958		472,266	688,886	1,161,152	100.0	

Table 5

Types of Cargo Handled on the Northern Sea Route  
1957-58  
(Continued)

- a. 9/
- b. 10/. Figures presented in this report on the 1958 season are provisional end-of-season estimates . . . .
- c. The term standard is a unit of measure in the timber industry. The total figures for timber cargo as reported in the original source were expressed in standards and cubic meters. In this report, those figures have been converted to metric tons at ratios of 1 standard to 2.5 metric tons and 1 cubic meter to 0.65 metric ton.
- d. Total listed in source is 26,582. Individual figures add up to 27,912. Deduct mis-entry of 956 tons for "Other Eastern Sector ports" and correct total is 26,956.
- e. Details on ore and unidentified cargoes are not yet available for 1958 and are tentatively included with "miscellaneous" cargoes.

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The use of reliable river routes into the Arctic would insure the delivery of cargoes to locations which might otherwise be under-supplied if an ice blockade should prevent ships from the Western USSR and the Far East from entering the Central Arctic. The increases noted above, however, will first require an extensive river shipbuilding program to supplement shortages which currently exist in the Lena River Steamship Agency.

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APPENDIX A

A BRIEF HISTORY OF THE CHIEF DIRECTORATE  
OF THE NORTHERN SEA ROUTE

The Chief Directorate of the Northern Sea Route (Glavnoye Upravleniye Severnogo Morskogo Puti -- GUSMP) was established in 1932 by a decree of the Council of Peoples Commissars. Its status was that of a Chief Directorate directly subordinate to the Council of Peoples Commissars, which in 1946 became the Council of Ministers. After the death of Stalin, GUSMP was made subordinate to the Ministry of the Maritime and River Fleets. When these two organizations became separate ministries in 1954, GUSMP became subordinate to the Ministry of the Maritime Fleet, which is its current status.

During the course of its existence, GUSMP has controlled most activities in the Soviet Arctic with the exception of Dal'stroy enterprises. A reorganization of this directorate was indicated in 1957, but it is not possible to form any definite conclusions of its extent on the basis of details which are currently available. GUSMP still controls its own aviation, construction, communications, hydrographic, meteorological, medical, and supply organizations, which, with a few exceptions, are the only organizations of their kind that exist above the Arctic Circle.

Heads of the Chief Directorate of the Northern Sea Route since its establishment in 1932 were as follows:

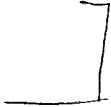
<u>Date</u>	<u>Name</u>	<u>Background</u>
1932-39	Otto Y. Shmidt	Scientist, Arctic explorer
1939-46	Ivan D. Papanin	Arctic explorer, Rear Admiral
1946-48	Aleksandr' A. Afanase'yev	Deputy Minister of the Merchant Fleet
1948-52	Aleksandr' A. Kuznetsov	Major General of Aviation
1952-57	Vasiliy F. Burkhanov	Rear Admiral
1957-	Aleksandr' A. Afanase'yev	May be same as above

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Table 7

Registry, Number, and Tonnage of Western Vessels Operating on the Northern Sea Route  
1954-58

Registry of Vessels	1954 a/		1955 b/		1956 c/		1957 d/		1958 e/	
	Number of Vessels	Total Tonnage (Gross Register Tons)	Number of Vessels	Total Tonnage (Gross Register Tons)	Number of Vessels	Total Tonnage (Gross Register Tons)	Number of Vessels	Total Tonnage (Gross Register Tons)	Number of Vessels	Total Tonnage (Gross Register Tons)
Norwegian	19	63,742	N. A.	N. A.	15	47,061	14	39,570	12	41,809
British	9	27,453			9	32,816	9	31,859		
Costa Rican					2	7,536	3	12,332	1	5,129
West German	1	3,126			6	16,596	6	19,152	15	53,557
Danish	2	5,130			4	11,664				
Greek					2	9,800				
Italian										
Swiss	1	4,941			1	4,941	2	9,897		
Liberian					1	2,297	1	2,666	2	5,621
Finnish					1	2,570			6	18,442
Panamanian					1	2,856	1	1,763		
Swedish	1	2,945					3	8,074 f/	1	2,302
Dutch									1	2,902
Unidentified									1	3,410 g/
<b>Total</b>	<b>33</b>	<b>107,337</b>	<b>38</b>	<b>117,800</b>	<b>42</b>	<b>138,137</b>	<b>43</b>	<b>137,823</b>	<b>39</b>	<b>133,172</b>

a. 14/

b. The number and tonnage of vessels by registry is not available for 1955. Source 15/ gives the number of total ships involved during 1955. Tonnage is estimated on the basis of average tonnage of vessels chartered during the 1954 season.

c. 16/

d. 17/

e. 18/

f. Tonnage is known for only two vessels. Tonnage of third vessel is estimated on basis of average known tonnage.  
g. Tonnage of unidentified vessels is not known. Tonnage is estimated on basis of average known tonnage.

Estimated Speeds and Conditions Encountered in Crossing the Northern Sea Route

Point-to-Point	Mileage	Average Speed		Elapsed Time (Hours)	Elapsed Time (Hours)	Earliest and Latest		Comment
		Knots	Fast Speed			Openings	Closings	
Arkhangel'sk/Murmansk to Kara Gate	584	53	11	42	14	Mid-June to early July	Mid-October to mid-November	During these periods this area is ice free, and ships of all sizes can operate without icebreaker escort.
Kara Gate to Dikson	520	47	11	37	14	Early July to late July	Early October to late October	Once the Kara Gate is opened, the route to Dikson is usually ice free, and requires no icebreaker escort.
Dikson to Vil'kitskogo	460	72	6.4	38	12	Mid-July to mid-September	Late September to early October	Navigation between Dikson and Tiksi is determined by the ice and wind conditions in Proliv Vil'kitskogo. The area is never entirely ice free and always requires icebreaker escort.
Vil'kitskogo to Tiksi	540	72	7.5	45	12	Mid-July to mid-September	Late September to early October	
Tiksi to Ambarchik	805	96	8.0	57	14	Mid-July to mid-September	Mid-September to early October	The route between Tiksi and Pevek is relatively ice free during this period, but icebreaker escort is sometimes required.
Ambarchik to Pevek	200	24	8.3	14	14	Mid-July to mid-August	Mid-September to early October	

Table 8  
Estimated Speeds and Conditions Encountered in Crossing the Northern Sea Route  
(Continued)

Point-to-Point	Average Speed		Elapsed Time (Hours)	Knots	Elapsed Time (Hours)	Knots	Earliest and Latest Closings		Comment
	Mileage	Fast					Openings		
Pevek to Provideniya	714	120	5.9	51	12	51	Early July to mid-August	Early October to late October	Navigation between Pevek and Provideniya is determined by ice conditions in Proliv Longa. The area is never ice-free and always requires icebreaker escort.
Total	3,823	484		284					
				(20 days 4 hours)					(11 days 20 hours)



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APPENDIX C

GAPS IN INTELLIGENCE

There are no basic figures on any phase of Northern Sea Route operations on which it is possible to formulate reasonable estimates.

except for port programs, which account only for specific types of cargoes unloaded at particular ports during a given period, the Soviet officials present no data on complete details.

The most critical gaps in intelligence relate primarily to exact details on port facilities and the total cargoes actually handled. Information on port facilities or, in their absence, on cargo handling procedures at Arctic ports is most often reflected in complaints that certain machinery was not available. A large number of lighters and barges are used for ship-to-shore and oceangoing operations, but this does not preclude the possibility that some large-scale equipment may be available at major locations.

The cargo totals presented in this report are expressed in terms of cargo handled and do not represent the exact volume of cargo involved. Some duplication of figures has necessarily been involved because of internal transshipment of cargoes.

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APPENDIX D

SOURCE REFERENCES

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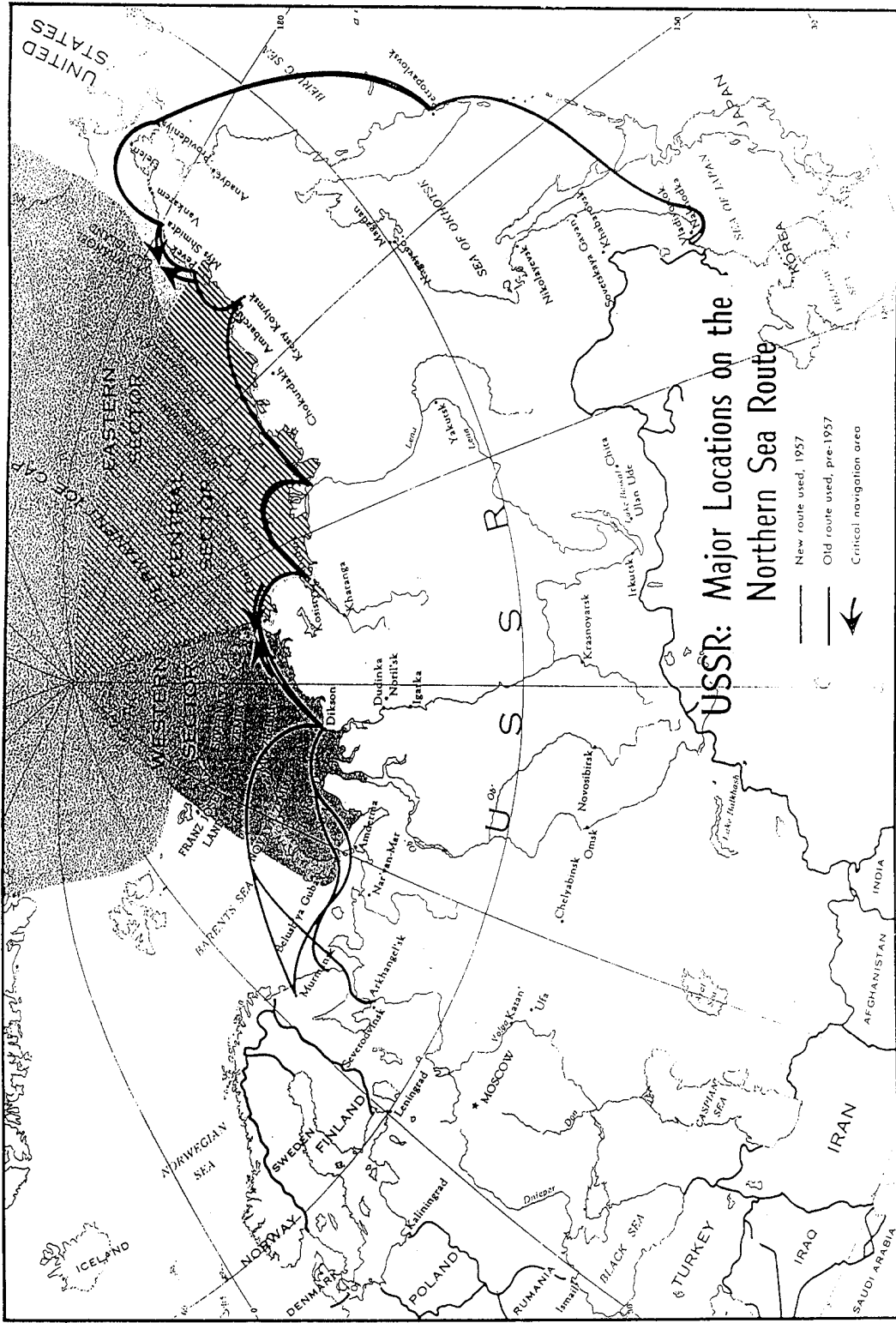


Figure 1

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23 March 1959, TOP SECRET

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A recent reexamination

affects Tables 8 and 9 in the subject report. These tables have been revised and reprinted, and the new versions (attached) should be stapled directly over the originals.

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