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INTELLIGENCE MEMORANDUM

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THE RIVER SHIPBUILDING INDUSTRY OF THE USSR

CIA/RR IM-406

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CIA/RR IM-406
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THE RIVER SHIPBUILDING INDUSTRY OF THE USSR*

Summary and Conclusions

The river fleet of the USSR has increased from an estimated total of 1,600 self-propelled and 4,100 non-self-propelled vessels in 1945 to an estimated total of 6,200 self-propelled and 16,000 non-self-propelled vessels in 1955. The river fleet will haul about 140 million metric tons** of cargo during 1955, an increase of 65 percent over the 85 million tons hauled in 1950. The increase does not, however, meet the requirements of the Fifth Five Year Plan (1951-55), and although the tonnage of cargo hauled by the river fleet is increasing, it is doing so at an annually decreasing rate.

Basic techniques used in the building of both self-propelled and non-self-propelled vessels in the USSR are not always modern, though adequate. Despite efforts to mechanize the industry, production is hampered by the need for hand work, shortages in materials and machinery, and badly drawn plans for interplant cooperation which compel individual yards to manufacture goods that should normally be drawn from industrial channels. No major plant expansion is planned. Every indication is that planners expect to obtain a maximum of production without the increase in plant area or the addition of manpower or machinery required for additional production. Within this framework, no great increase in production capacity is anticipated for the future.

The rivers of the USSR carry about 10 percent of the total freight tonnage transported within the USSR. This figure does not indicate, however, the relative importance of river transportation in those areas of the country where rivers are the sole means of transportation for crops and manufactured goods.

Despite the differences between the river fleets and their operation in the US and the USSR, a comparison in terms of ton-kilometers***

* The estimates and conclusions contained in this report represent the best judgment of ORR as of 1 January 1955.

** Tonnages throughout this report are given in metric tons.

*** A ton-kilometer is 1 physical metric ton of cargo hauled a distance of 1 kilometer.

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indicates that the Soviet river fleet hauled 6.1 percent, or 61.8 billion ton-kilometers, of all Soviet freight in 1953 and that the US river fleet transported 18 percent, or 119.3 billion ton-kilometers, of US freight in 1953. 1/* During the same year the Soviet river fleet consisted of 18,900 self-propelled and non-self-propelled vessels, whereas the US had an inventory of 18,570 towboats, tugs, barges, scows, lighters, and car floats. This total did not include fishing boats or the big ore, coal, and grain carriers on the Great Lakes. 2/ The production of river fleet vessels in the USSR during 1954 is estimated at 1,470 units, whereas 266 inland vessels were launched during the first 9 months of 1954 in the US, a rate of about 350 vessels for the year.

The comparisons tentatively drawn from these figures show that the river shipbuilding industry of the USSR constructed over four times the number of vessels as the US in 1954 to haul somewhat comparable tonnages of cargo by water and to increase the size of the river fleet at a rate considerably greater than that of the US. The USSR requires a river fleet many times the size of the US fleet to haul comparable tonnages because the Soviet navigation season is far shorter than the season in the US and because US efficiency is considerably greater than that displayed by the Soviet inland fleet.

I. Introduction.

The rivers of the USSR carry about 10 percent of the total freight transported within the USSR. The river freight is carried in ships of all sizes and types, the majority of which have been built in shipyards located within the USSR. In many areas of the country, particularly in the hinterland, the rivers are the sole means of transport for crops and manufactured goods. Transportation plan fulfillment is tied so closely to river transport that any adverse condition, such as lack of water, lack of vessels, or inadequate schedules, results in nonfulfillment of the plan in a particular area.

* Footnote references in arabic numerals are to sources listed in Appendix C.

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Within this context, shipbuilding for the rivers takes on the same degree of importance as does the building of locomotives and freight cars for the railroads. Accordingly, estimates of the size of the Soviet river fleet can best be obtained by analyzing the future of water transportation. The needs of this area of the Soviet economy will yield some idea of the scale of building needed to meet this future.

It should be apparent at the outset that no fine line can be drawn beyond which transport needs are not reflected in shipbuilding. It is assumed that shipbuilding in the USSR is undertaken as needed to meet specified, planned water transportation goals.

II. Administrative Structure and Key Personnel.

In general, all Soviet shipyards and associated enterprises engaged in river shipbuilding activities of a commercial nature are under the jurisdiction of the Ministry of the River Fleet.*

In 1954 the Ministry of the River Fleet was headed by Minister Z.A. Shashkov. Shashkov has, in the past, been the recipient of great trust on the part of the government. When reorganization took place in 1953, he was the Minister for the River Fleet. His appointment as Minister for the Maritime and River Fleet as a result of the reorganization was believed to be an advancement. Another indication of the esteem in which he has been held was the award to him of the Order of Lenin. 3/

* Before 15 March 1953, two separate ministries were functioning in the field of water transportation. The Ministry of the Maritime Fleet concerned itself with all transportation outside the USSR. The Ministry of the River Fleet controlled all inland water transportation. Each ministry was headed by a minister, and administrative and operational functioning was similar. These two ministries were consolidated into a Ministry of the Maritime and River Fleet which, in addition to bringing together under one minister all water transportation functions, also assumed control over the previously autonomous Main Administration for the Northern Sea Route. This situation existed until 29 August 1954, when the one ministry was again divided into the previous two. The Main Administration for the Northern Sea Route was then transferred to the Ministry of the Maritime Fleet.

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Before the 1954 reorganization it was apparent from reports contained in the Soviet press that Shashkov's ministry was not functioning according to plan, despite efforts to tighten up control over laggard areas. For example, Shashkov ordered the consolidation of the Estonian Steamship Company, the Latvian Steamship Company, and the Baltic Steamship Company into a larger Baltic Steamship Company. In addition, he consolidated, under the Main Administration for Petroleum Transportation, the major petroleum carriers: the Caspian Steamship Company, the Volga Tanker Steamship Line, and the Reydtanker Steamship Company. Finally, the Soviet Tanker Steamship Company, which had operational control over all seagoing Soviet tankers, was abolished, and the tankers were placed directly under the control of the steamship companies in whose areas the tankers normally operated.

As a result, this most recent reorganization is difficult to analyze. It may be assumed that reorganization is in line with current steps to decentralize administrative control over large, unwieldy types of organizations such as the former Ministry of the Maritime and River Fleet. Since Shashkov is retaining the post of Minister for the River Fleet, however, little change in the basic organization concerned with river shipbuilding is anticipated at present.

III. Technology.

The greatest technical advance made by Soviet river shipbuilding yards in recent years involves the use of what the Russians term the "continuous flow" method of ship assembly. As employed in the USSR, this method involves the use of an installation fitted with means for prefabrication of ship sections or the use of an installation which can receive prefabricated sections from an external source. In both cases the sections are assembled into finished hulls on an assembly-line basis. This method of building ships has not, however, been widely introduced. 4/

Emphasis has been placed on increased production without expanding present plant facilities. This trend originated in 1949 and was then considered to be of special significance to the industry. At the same time, emphasis was placed on the need for training of personnel, for better supply of equipment, and for increasing allocations of machinery and materials. 5/

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Technological advances have been made in several fields, particularly in the design and construction of new types of vessels constructed by the use of the "continuous flow" method as need has arisen for such types. Two examples are the Moskvich-type passenger motorship -- which is usually fitted with one or two 3DC engines, giving the vessel a rating of either 150 or 300 horsepower (hp) -- and the 800-hp cargo vessel plying the Volga River and capable of hauling a load of 2,000 tons.

It is the obvious intention of Soviet planners to advance the technical processes utilized in the shipbuilding industry, within the limits of available materials. Although the USSR recognizes 6/ that one of the best ways to bring about a reduction in the time needed to build river vessels is to develop a well-organized intradepartmental system of yard cooperation, coupled with specialization by these enterprises in the production of standardized parts and units, very little has been done in this connection, and completion dates for new ships are usually not met.

Interplant cooperation is very poorly developed among the river industrial enterprises. Shipboard components and parts are manufactured in accordance with individual orders or are manufactured in small lots. Production costs for manufacturing done in this manner are from 1.5 to 3 times the cost of similar items mass-produced.

Practically all yards make their own fasteners and clamps, bolts, nuts, screws, rivets, hinges, handles, and chains. The Riga Shipbuilding Ship Repair Yard has 40 percent of its total lathe park engaged in the manufacture of such items and fittings.

Many fairly large enterprises have special machines, such as automatic knurlers and bolt- and nut-making machines, which have been idle for years because they have no equipment or special tools. It is reported that hundreds of lathes are idle for this reason. Enterprises of the Ministry of the River Fleet have been unable to obtain standard cutting and fitting tools and must make for themselves needed drills and reamers, tap and die wrenches, screwdrivers and chisels, standard milling cutters, and even three-jawed chucks. The result is a reduction in gross production because a considerable number of workers in the main shops are diverted to the production of parts which are not included in gross and goods production returns.

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Routine machine processes in Western yards -- for example, the bending of pipe by hydraulic means -- are just beginning to find their way into use in Soviet river yards. Other manufacturing processes are quite crude. In the Limenda Yard " ... shears have been installed for the cutting of (welding) electrodes. When electrodes were cut by hand from iron sheets they were not even and were received in various lengths. Now the welders in the shops receive quality electrodes, prepared by mechanical means" 7/

The river shipbuilding industry has attempted to utilize the products of other industries in an effort to save scarce materials. The authorities do not hide the fact that materials are scarce. Efforts continue to devise replacements as well as substitutes. Wooden plastics, such as lignofol and lignoston, are used as bearing materials, replacing babbit and bronze in bearings used in the stern tube and struts. 8/ Vinylplastics are used in finishing compartments, and rock wool is used as an insulating material in refrigerated holds of ships. Polychloro-vinyl plastic foam, Mark PKhV-9, is used as a replacement for cork where heat, sound, and hydro-insulating materials are needed. 9/

IV. Production.

Production estimates in this report are necessarily based on several assumptions. It has been assumed that production and transportation needs are so intimately connected as to be virtually indistinguishable. Furthermore, it has been assumed that a specific unit of hp for self-propelled craft and a specific unit of cargo-carrying capacity for non-self-propelled craft will be required for each ton of cargo. On the basis of these assumptions, certain use factors for the Soviet inland fleet have been derived as follows: 0.0091 hp per ton of cargo and 0.0836 tons of cargo-carrying capacity per ton of cargo.*

The Fifth Five Year Plan (1951-55) gives some indication of the scope of the water transportation program and, on the assumption cited, the scope of construction. This plan stipulated that the annual increase in transport was to be about 15 to 16 percent per year. However, numerous statements in the Soviet press 10/ have indicated that annual plans have not been met, and the most recent report for the first 6 months of 1954 reports fulfillment of about 82 percent in ton-kilometers and 37 percent in tons. 11/ The former Ministry of the Maritime and River Fleet has released data indicating that the comparative share of consumer goods cargo moved by water transportation has declined below the 1940 level. 12/

* See Appendix A, Methodology.

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The Fifth Five Year Plan called for an increase in cargo haulage by river transportation of 75 to 80 percent for the period. Since total tonnage hauled in 1950 was 85 million tons, the estimated increase should yield a total tonnage for 1955 of between 148.75 and 153 million tons. However, based on statements in the Soviet press, 13/ performance for 1953 is estimated to have been 119.1 million tons. Had the plan been met, performance would have been within the range of 123.25 to 125.8 million tons in 1953. Hence actual plan fulfillment appears to be running between 96.6 and 94.7 percent of plan.

Should this pattern continue, by 1955 annual tonnage hauled would amount to about 140 million tons, a 65-percent increase over 1950, or about 93 percent of the planned figure for the period. Thus it is evident that while cargo haulage by river transportation is increasing, it is doing so at an annually decreasing rate. The inability to attain the planned goal was caused by material shortages, the transfer of skilled manpower to the agricultural sector of the economy, the diversion of apparently extensive portions of production capacity to the manufacturing of goods and equipment for farms and machine tractor stations, and the apparent shift of emphasis away from the actual construction of new river fleet vessels. The estimated growth of the Soviet river fleet during 1945-55 is shown in Table 1.

Table 1.

Estimated Growth of the River Fleet in the USSR
1945-55

Year	<u>Self-Propelled Vessels</u>		<u>Non-Self-Propelled Vessels</u>	
	<u>Number</u>	<u>Horsepower (Thousand)</u>	<u>Number</u>	<u>Cargo-Carrying Capacity (Million Metric Tons)</u>
1945	1,600	328	4,100	3.01
1946	1,700	355	4,500	3.26
1947	2,100	428	5,400	3.93
1948	2,700	555	7,000	5.1
1949	3,300	673	8,500	6.2
1950	3,800	774	9,700	7.1
1951	4,200	874	11,000	8.03
1952	4,800	979	12,300	9.0
1953	5,300	1,080	13,600	10.0
1954	5,700	1,170	14,700	10.8
1955	6,200	1,270	16,000	12.0

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V. Imports.

Records of the postwar years, together with planned production to 1955 from both Satellite and non-Satellite countries, indicate that imports of river vessels to the USSR for use on the rivers and lakes of the country are as shown in Table 2.

Table 2
Imports of River Vessels to the USSR
1946-55

<u>Year</u>	<u>Self-Propelled</u>		<u>Non-Self-Propelled</u>	
	<u>Number</u>	<u>Horsepower</u>	<u>Number</u>	<u>Cargo-Carrying Capacity (Metric Tons)</u>
1946-50	311	42,250	340	193,125
1951	28	8,500	63	74,000
1952	31	12,800	90	105,000
1953	29	15,600	92	107,200
1954	38	23,800	63	80,000
1955	4	1,600 a/	43	60,000

a. Partial estimate. Does not include data on vessels in the Satellite and Western river shipbuilding programs that are designed for export to the USSR.

VI. Inputs.

The basic material input groups for the river shipbuilding industry are steel and wood. Inputs for the production of river vessels in the USSR during 1954-55 are shown in Table 3.*

The problem of unit input has been resolved on the basis of Soviet practice. Since Soviet publications invariably refer to the basic units "tons cargo-carrying capacity" and "horsepower" for non-self-propelled and self-propelled vessels, respectively, these units have been retained. It is therefore possible to compile total input values

* Table 3 follows on p. 9.

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for any given river shipbuilding program by using these factors and applying them to the corresponding program.

Table 3
 Material Inputs for the Production of River Vessels
 in the USSR
 1954-55

Year	Input	Non-Self-Propelled	Self-Propelled	Total
1954	Steel (Thousand metric tons)	35	33	68
	Lumber (Million board feet)	144	18	162
	Copper (Metric tons)	4	93	97
	Petroleum (Metric tons)	245	65	310
1955	Steel (Thousand metric tons)	39	49	88
	Lumber (Million board feet)	167	25	192
	Copper (Metric tons)	4	137	141
	Petroleum (Metric tons)	280	100	380

VII. Conclusions.

The river shipbuilding industry of the USSR has reached a stage of development which enables it to cope with the building tasks assigned to it. Shipbuilding yards producing river ships in the USSR, however, are not comparable with Western yards, except in isolated cases, because neither techniques, machinery, nor manpower productivity are on a level with Western yards. No major expansion of plant facilities for the river shipbuilding industry in the USSR is planned for the future. Expansion is possible, however, and may be undertaken should the need arise. It is assumed that within the framework of existing agreements, extended as they expire, the USSR will import river craft to augment its own native-built fleet.

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APPENDIX A

METHODOLOGY

The use factors listed on page 6, above, have been derived from an examination of published Soviet material ^{14/} which yielded use factors for the years 1934 and 1935. In addition, a 1931 publication ^{15/} established an estimate of the hp and cargo-carrying capacity needed to meet a specific program. The three use factors thus derived were as follows:

	<u>1931</u>	<u>1934</u>	<u>1935</u>
Hp per metric ton	0.0053	0.011	0.0091
Cargo-carrying capacity per metric ton	0.044	0.09	0.0836

The 1931 figures were based on the transportation of 116 million tons of cargo, estimated by the Soviet planners. The best evidence is that this figure actually was 82 million tons of cargo, the highest prewar figure attained and not again reached until about 1950. Hence the efficiency indicated in a use factor based on 1931 was rejected in favor of the figures for 1934 and 1935, which were actually reported figures. Of the two years, 1935 indicated a greater efficiency. Therefore 1935, with its corresponding use factors, was selected. Inherent in this use factor are such intangibles as attrition caused by losses, age, and other variables, as well as changes in the efficiency pattern. Thus, for any given year in which the tonnage hauled is known or estimated, the use factors yield a fleet size for that year which is estimated to be reasonably accurate for computation purposes.

The yearly fleet totals shown in Table 1* were compiled by the use of these factors, applied against estimated cargo transportation figures. In turn, yearly differences, less imports, yielded production figures.

* P. 7, above.

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The primary materials for the river shipbuilding industry are steel and wood. Although it is recognized that certain engines are made of aluminum, the total number of engines using this material is unknown but is believed to be too small, over-all, to have any appreciable effect on production of that metal. It is therefore not included in the listing.

Material inputs for steel vessels, both self-propelled and non-self-propelled, were weighted in accordance with the tonnage figures developed in Table 3.*

* P. 9, above.

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APPENDIX B

GAPS IN INTELLIGENCE

The principal gap in intelligence on the river shipbuilding industry of the USSR is in information directly pertaining to its achievements. The Soviet press and publications are the main source of information, but coverage is spotty at this time. Hence reliance must be placed on other indicators than actual construction information and plans.

A secondary gap exists in detailed information regarding construction costs, manpower allocations, productivity, and inputs in other than that phase of building concerned with wooden ship construction.

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APPENDIX C

SOURCES

The principal sources of information for this report were (1) the Soviet press; (2) Soviet publications (books and periodicals); and (3) FBIS reports. These sources provided information which was evaluated as probably true. The file of detailed computations from which the tables on estimated river shipbuilding and material inputs were compiled is in CIA/ORR files.

Evaluations, following the classification entry and designated "Eval.," have the following significance:

<u>Source of Information</u>	<u>Information</u>
Doc. - Documentary	1 - Confirmed by other sources
A - Completely reliable	2 - Probably true
B - Usually reliable	3 - Possibly true
C - Fairly reliable	4 - Doubtful
D - Not usually reliable	5 - Probably false
E - Not reliable	6 - Cannot be judged
F - Cannot be judged	

"Documentary" refers to original documents of foreign governments and organizations; copies or translations of such documents by a staff officer; or information extracted from such documents by a staff officer, all of which may carry the field evaluation "Documentary."

Evaluations not otherwise designated are those appearing on the cited document; those designated "RR" are by the author of this report. No "RR" evaluation is given when the author agrees with the evaluation on the cited document.

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1. Traffic World, 30 Oct 1954, p. 76. U. Eval. RR 1.
2. Ibid., 16 Oct 1954, p. 75. U. Eval. RR 2.
3. New York Times, 7 Nov 1954, p. F. U. Eval. RR 2.
4. Vodnyiy transport, 6 Mar 1954, p. 1. U. Eval. RR 2.
5. Rechnoy transport, Sep-Oct 1949, pp. 1-4. U. Eval. RR 2.
6. Ibid.
7. Vodnyiy transport, 20 Apr 1954, p. 2. U. Eval. RR 2.
8. Rechnoy transport, 23 Jan 1954, p. 4. U. Eval. RR 2.
9. Rechnoy transport, Jan-Feb 1950, pp. 15-18. U. Eval. RR 2.
10. Vodnyiy transport, 25 Jul 1953, p. 2. U. Eval. RR 2.
11. Vodnyiy transport, 25 Jul 1953, p. 2. U. Eval. RR 2.
12. Vodnyiy transport, 1 Mar 1954, and other issues during 1953-54. U. Eval. RR 2.
13. [REDACTED]
14. Vodnyiy transport, 20 Aug 1953, p. 1. U. Eval. RR 2.
15. "Summary of Fulfillment of the State Plan for the Development of the National Economy of the USSR, 1953," translated from Pravda, 31 Jan 1954, p. 2. U. Eval. RR 2.
16. Socialist Construction in the USSR, Soyuzorgouchet, Moscow, 1936, pp. 314-318. U. Eval. RR 2.
17. Sudokhodstvo i sudostroyeniye, No. 1, 1931, p. 2. U. Eval. RR 2.

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