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THRU

Chief, Economic Research Area

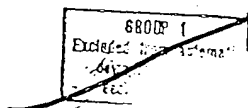
7 February 1964

Submission of Information for Department of State

1. The information included in the attached report, Production of Ethyl Alcohol in the USSR and Estimated Consumption of Grain Required, has been prepared at the request of Miss Luba Richter, INR/RSB, Room 7532, Department of State.

2. The responsible analyst is  
The information has been coordinated with

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Production of Ethyl Alcohol in the USSR and Estimated  
Consumption of Grain Required

In spite of the original plan to decrease the production of ethyl alcohol from food raw materials by 1965, production by this method has remained fairly constant during the Seven Year Plan and even rose in 1962. In 1961, the USSR produced 1.51 million metric tons\* of ethyl alcohol, of which .96 million tons were from food sources, and in 1962, the USSR produced 1.68 million tons, of which 1.09 million tons were from food sources.\*\*

Since it is believed that only about thirty-five percent of the food-derived alcohol is made from grain (the plan for 1961 was thirty-two percent and for 1962 the plan was thirty-six percent), and the USSR reports that four tons of grain are used to produce one ton of ethyl alcohol, the actual consumption of grain for the production of ethyl alcohol can be estimated at about 1.34 million tons in 1961 and 1.53 million tons in 1962. Figures for total output of ethyl alcohol in 1963 are not yet available, although production of non-food ethyl alcohol was expected to be about 80 million decaliters (658,000 tons). If it is assumed that the ratio of non-food ethyl alcohol to food-based ethyl alcohol in 1963 was about the same as that in 1962, total production may have been on the order of 1.88 million tons, of which 1.22 million would be food-based ethyl alcohol. Grain requirements, again assuming that 35 percent of the food-based ethyl alcohol was made from grain, would have been about 1.7 million tons.

Ethyl alcohol may presently be in short supply in the USSR despite the fact that the modest 7 Year Plan goal has already been exceeded. This shortage is partly a result of the lag in attaining full capacity operation of some of the newer synthetic alcohol plants and partly a result of the failure of synthetic rubber plants to convert rapidly to petrochemical raw materials and thus forego the use of ethyl alcohol.

\* All tonnages are given in metric tons.

\*\* Soviet reports on production of ethyl alcohol are in terms of decaliters of 88 percent alcohol by volume, which have been converted to metric tons of 88 percent alcohol.

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THRU 1 Chief, ERA

8 April 1964

Supplementary Data on Soviet Production and Consumption  
of Ethyl Alcohol

Attached are supplementary unclassified data on Soviet production and consumption of ethyl alcohol which you may wish to forward to Congressman Mahon. Included is the estimate of US military consumption of ethyl alcohol which you requested. The military estimate was obtained from the Defense Supply Agency, the Army Materiel Command, and the Defense Medical Supply Center.

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~~GROUP 1  
Excluded from automatic  
downgrading and  
declassification~~

Production and Use Pattern of Ethyl Alcohol in the USSR

I. Production in 1955-63 and Plan, 1965\*

	<u>Total</u> (in millions of metric tons)	<u>of which from edible sources</u>		<u>from nonedible sources</u>
		<u>Amount</u> (in million tons)	<u>Percent of total</u>	<u>Amount</u> (in millions of tons)
1955	1.05	.89	84	.16
1956	1.06	-	-	-
1957	1.29	-	-	-
1958	1.35	.96	71	.39
1959	1.39	.90 (est)	65	.49
1960	1.40	.87 (est)	62	.53
1961	1.51	.96	64	.55
1962	1.68	1.09	65	.59
1963	1.62	.96	59	.66
1965	1.67	.82 (plan)	49 (plan)	.85 (plan)

\* Soviet reports on production of ethyl alcohol are in terms of decaliters of 88 percent alcohol by volume, which have been converted to metric tons of 88 percent alcohol. (121.5 decaliters = 1 ton)

## II. Use Pattern

Most of the supply of ethyl alcohol in the USSR is consumed in beverages (vodka, etc.) and for the manufacture of butadiene for synthetic rubber. Other uses include the manufacture of chemicals, use as a solvent in the manufacture of lacquers, varnishes, enamels, plastics, shellac and resin products, toilet preparations, and pharmaceutical products. It is also used for medicinal purposes, for laboratory and experimental purposes, and may be used to some extent as an antifreeze. Possible direct military uses include fuel-injection and de-icing for aircraft, the manufacture of explosives (smokeless powder, PETN, tetryl, etc.), chemical warfare agents, fuel for torpedos, and propellant for missiles.

Information from Soviet sources regarding consumption of ethyl alcohol in the USSR for the above purposes is fragmentary but sufficient to show that consumption for military purposes in recent years probably has been a small share of the total supply. This information, which is given in the Appendix, can be used to construct the following approximate use pattern of Soviet ethyl alcohol in 1962.

Estimated Use Pattern of Ethyl Alcohol in the USSR, 1962 a/

<u>Use</u>	<u>Amount</u> <u>(thousand metric tons)</u>	<u>Percent of</u> <u>Total</u>
Beverages (vodka, etc)	600	36
Synthetic rubber	750	45
Chemicals	150	9
Acetic acid - 55		
Acetaldehyde - 20		
butyl alcohol - 12.5		
ethyl acetate - 12.5		
Other chemicals - 50 b/		
Solvent, other technical, medicinal, and direct military uses	180	10
Total	<u>1,680 c/</u>	<u>100</u>

a. For methodology, see Appendix.

b. Includes mainly ethylene, ethyl chloride, ethyl ether, and ethyl esters.

c. Total supply may have been somewhat larger than this figure. Soviet imports of ethyl alcohol (all from Cuba) in 1962 were about 54,000 tons. Exports probably were not as high.

Thus, it appears that Soviet consumption of ethyl alcohol in 1962 for direct military purposes was some part of 180,000 tons or less than 10 percent of total Soviet consumption of alcohol. In fact, it probably was considerably less than 180,000 tons or 10 percent of the total because solvent uses, other technical uses, and medicinal use probably would have accounted for a large share of this residual 180,000 tons.\*

For comparison, US consumption of ethyl alcohol for military purposes in 1963 is estimated to have been less than 6,000 metric tons, broken down as follows:

<u>Use</u>	<u>Amount</u> <u>(metric tons)</u>
Military propellants and explosives	3,600
Aircraft fuel injection, de-icing and torpedo fuel	1,500
Chemical warfare agents	400
Military medical use	350
	<hr/>
Total	5,850

The foregoing data refer to Soviet consumption of ethyl alcohol in 1962. No major changes either in output or in pattern of consumption of ethyl alcohol are believed to have taken place since then. The data presented, although they are only approximations, support the belief that Soviet consumption of ethyl alcohol for military purposes accounts for only a small share of total Soviet output of this commodity. It therefore seems highly unlikely that the recent Soviet grain purchases are related in any significant way to Soviet requirements for ethyl alcohol for military purposes.

\* In 1955 US consumption of ethyl alcohol for solvent use alone was about 320,000 metric tons.

## Methodology

### 1. Beverages -

Converted from a reported production in 1962 of vodka and vodka products of 162 million decaliters. (Narodnoye Khozyaystvo SSSR b 1962 godu, p. 203). Conversion was made on the basis of 10 decaliters of vodka and vodka products to 4.5 decaliters of 88 percent alcohol. One ton of 88 percent ethyl alcohol equals 121.5 decaliters.

### 2. Synthetic Rubber -

Estimated from Soviet statement that the production of synthetic rubber in 1959 consumed about 80 percent of the alcohol used for technical purposes in the USSR. (N.P. Fedorenko, Ekonomika promyshlennosti sinteticheskikh materialov, Moskva, 1961, p. 198). Soviet consumption of ethyl alcohol for technical purposes in 1962 is estimated to have been about 960,000 tons, based on Soviet statements indicating that about 57 percent of total alcohol in the USSR is used for technical purposes. 80 percent of 960,000 tons is 768,000 tons. The estimate of 750,000 tons was selected because the USSR in the period from 1959 to 1962 was (and still is) substituting petroleum hydrocarbons (butane, butylene) for ethyl alcohol in the manufacture of synthetic rubber.

### 3. Chemicals -

Estimates based on Soviet statement that in 1965 the percentage of total output of technical ethyl alcohol consumed for the production of selected chemicals would be as follows: Acetic acid - 5.7%; acetaldehyde 2.1%; butyl alcohol - 1.3%; and ethyl acetate - 1.3% (N.P. Fedorenko, op.cit., p. 199). The estimate of 50,000 tons for the manufacture of "other chemicals" is a more or less arbitrary judgment based on the knowledge that large quantities of ethyl alcohol are used annually in the USSR just for the manufacture of ethyl chloride for further processing into tetraethyl lead; and that the USSR must also consume substantial quantities of ethyl alcohol for the manufacture of ethylene, ethyl ether and ethyl esters. The estimated Soviet consumption in 1962 of 150,000 tons for the manufacture of "chemicals" compares with U.S. use for this purpose in 1955 of about 800,000 tons.

4. Solvent, Other Technical, Medicinal, and Direct Military Uses -

A residual figure obtained by subtracting the estimated amounts for beverages, synthetic rubber, and chemicals from the total output of ethyl alcohol.