~~TOP SECRET~~ CONFIDENTIAL #53218

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CENTRAL INTELLIGENCE AGENCY

OFFICE OF NATIONAL ESTIMATES

28 February 1951

MEMORANDUM OF INFORMATION NO. 29

SUBJECT: Soviet Aviation Gasoline Situation

PROBLEM

1. To determine the adequacy of Soviet aviation gasoline supplies to support a global war.

2. If Soviet supplies are adequate, how can we explain the fact that Soviet requirements are only a fraction of those of the United States Air Force?

CONCLUSION

ADEQUACY OF SOVIET AVGAS SUPPLIES

3. If the USSR were engaged in a global war in 1951 there would be a stringency in the supply of aviation gasoline. This tight supply situation, however, would not prevent the USSR from carrying out its initial campaigns. As explained in detail in the discussion, Soviet minimum essential wartime

requirements for high octane aviation gasoline in 1951 are estimated to be 1,850,000 metric tons. Availability from production will be about 2,180,000. This means that some surplus exists above the minimum wartime requirements. A larger surplus is estimated in the lower octane ratings employed for training purposes.

4. The aviation gasoline stockpile is probably the equivalent of at least several months requirements.

5. General refining facilities, as opposed to the specialized facilities for the production of high octane aviation gasoline, are capable of producing ample supplies of jet fuel to meet the requirements of the number of jet planes (primarily fighters) available to the USSR in 1951. The process of conversion of the Soviet Air Forces to jets more than trebles the volume of fuel required per plane for each hour of flying time because of the greater fuel consumption of jets. In the future this would reduce the relative dependence on aviation gasoline, but would increase Soviet problems of transportation and storage.

VULNERABILITY OF AVGAS INDUSTRY TO AN ATTACK

6. Soviet aviation gasoline refineries are particularly vulnerable to strategic air attack and are within the target systems selected by USAF intelligence. It is estimated that after

an A-bomb attack of the type suggested by the USAF, none of the surviving refining facilities would be capable of producing 100 octane aviation gasoline and the refining facilities for all liquid fuels would be cut to a scant 3.3 million metric tons. This attack, however, would not reduce aviation gasoline supplies to the point of preventing the initial short campaigns now forecast for the Soviets. Air capabilities for a prolonged war would, of course, be severely reduced.

REASONS FOR DISPARITY OF SOVIET AND USAF REQUIREMENTS

7. Since the requirements of the US Air Force for high octane combat aviation gasoline are estimated to be approximately 4 to 5 times as great as those of the Soviet Air Forces*, it is obvious that the two air forces must be assumed "to fight two different kinds of wars." The main reasons for this disparity in requirements are as follows:

a. It is assumed that during 1951 Soviet forces could carry out certain of their assumed campaigns with little resistance;

b. The campaigns visualized for the Soviet forces do not include strategic air operations as extensive as those contemplated for US Air Forces. The large scale use of medium and heavy bombers requires extremely large quantities of high octane aviation gasoline;

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* The disparity in jet fuel requirements is even greater.

c. The Soviet Air Forces do not carry nearly as much cargo nor as many personnel by air transport as do the USAF.

d. The exterior lines of communication of the Soviet Air Forces will not be as long as those of the USAF. Moreover, their bases of operations will be closer to the points of air activity; and

e. The Soviet Air Forces do not carry out training programs as extensive as those of the USAF.

DISCUSSION

AVAILABILITY OF AVIATION FUEL

8. In 1951, the total production of high octane aviation gasoline (grades 100/130, 95/130 and 95/115) for the Soviet bloc is estimated to be about 2,180,000 metric tons.* All of this except 110,000 metric tons will be produced in the USSR. In addition, about 1,750,000 metric tons of 85 to 91 octane (suitable for training purposes) can be produced. The actual size of the aviation gasoline stockpile is not known, although

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* All of the figures in this memorandum are the preliminary estimates of ORR/CIA. Requirement figures were derived from USAF data. Although the research office in A-2 has informally expressed some disagreement on particular figures, it informally agrees with the general conclusions.

it is relatively certain that stockpiles of aviation fuel and critical components such as alkylate and iso-octane exist in quantities equivalent, at least, to several months requirements.

9. General refining facilities, as opposed to the specialized facilities for high octane aviation gasoline, are sufficiently flexible to produce a large volume of jet fuel. Approximately 40 percent of a barrel of crude oil* can be converted to jet fuel. From a practical viewpoint there can be no shortage of jet fuel unless there is a general shortage of refined products. In the event of a shortage of refined products, however, it is possible that jet fuel would be given the necessary priority over motor gasoline and other fractions. There will be ample jet fuel to supply the requirements of the number of jet planes (primarily fighters) estimated for 1951.

10. A situation similar to that for jet fuels exists in the case of low octane aviation gasoline in that a large volume can be produced by general refining facilities. Aviation fuels ranging from 75 to 85 octane may be substantially the same as good quality motor gasoline, possibly with closer specifications on such items as distillation and vapor pressure.

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* Total crude oil production for the Soviet bloc in 1951 will probably be about 49 million metric tons.

TABLE I

TOTAL AVAILABILITY AVIATION GASOLINE
(EXCLUDING LOW OCTANE)
FROM USSR AND SATELLITES, 1951

(thousands of metric tons)

		1951	
100/130		460	
95/130		740	
95/115		930	
	Total High Octane		2,180
85 to 91		1,750	
	Total 85 and above		3,930

REQUIREMENTS

11. The estimates of aviation fuel requirements given below are based on the courses of Soviet military action visualized

25X1

[redacted]

25X1

[redacted] The composition of the Soviet Air Forces for these campaigns, including jet aircraft, were estimated by the USAF. The fuel requirements are directly related to the types of aircraft, fuel consumption rates, and the duration and frequency of missions. In addition, these estimates of fuel consumption are based on the experience of the USAF and their analyses of the characteristics of Soviet aircraft. After computing fuel requirements, 10 percent was added to cover logistic losses.

TABLE II

SOVIET WARTIME REQUIREMENTS
OF AVIATION FUEL, 1951

(thousands of metric tons)

Grade**		1951*	
100/130		360	
95/130		640	
95/115		850	
	Total High Octane		1,850
Below 95		20	
	Total Aviation Gasoline		1,870

* War beginning the last part of the previous year.

** From a theoretical viewpoint the highest quality fuel is desired for all combat aircraft operations. From a practical viewpoint, however, there must be a compromise between quality and quantity. It is considered reasonable that Soviet medium and large bombers require the maximum lean and rich ratings, or the USSR grade 100/130. The fighters and light bombers may tolerate a sacrifice on lean rating, but probably not on rich rating. Such a fuel is represented by the USSR grade 95/130. The attack, transport, and some advanced training aircraft could tolerate the sacrifice in both lean and rich ratings of the USSR grade 95/115. The remaining training aircraft give adequate operation on grades below 95 octane.

MILITARY CAPABILITIES

12. A comparison of the aviation gasoline availability and the aviation gasoline requirements in Table III below reveals that the supply will be sufficient for the campaigns listed in

25X1 [redacted]

TABLE III

SOVIET REQUIREMENT-AVAILABILITY BALANCE
FOR WAR THROUGHOUT 1951

(thousands of metric tons)

	Availability From Production**	Military Requirement	Surplus*
100/130	460	360	100
95/130	740	640	100
95/115	980	850	130
Total High Octane	2,180	1,850	330
85 to 95 Octane	1,750	20	1,730
Total Avgas	3,930	1,870	2,060

* Available for reserves or civilian use as a cushion against war damage, or for support of areas outside the present Orbit

** There will be an unknown additional amount available from stocks.

13. Table III indicates that although there will be a definite stringency in aviation gasoline supplies, there will be no aviation gasoline shortage sufficiently critical to prevent

25X1 the following campaigns listed [redacted]

a. Simultaneously

(1) A campaign against Western Europe, including Italy.

(2) An aerial bombardment against the British Isles.

(3) Campaigns against the Near and Middle East, including Greece and Turkey.

(4) Campaigns in the Far East.

(5) Air attacks against the US and Canada.

(6) Attacks against Alaska and the Aleutians.

(7) Air offensive against Anglo-American sea communications.

(8) Defense of the Soviet Union against hostile attack.

b. As soon as possible after the occupation of the channel port areas, a full scale air offensive against the British Isles.

c. As soon as feasible campaigns against Scandinavia and the Iberian Peninsula.

d. As necessary, air attacks against Pakistan.

VULNERABILITY OF THE LIQUID FUELS INDUSTRY TO STRATEGIC AIR ATTACK

14. An analysis by USAF intelligence* of the vulnerability of the USSR to strategic air attack on the liquid fuels industry revealed the following:

a. The essentiallity of a substantial volume of liquid fuel, the comparatively short production "pipe line," the limitations on storage, the comparatively high degree of concentration,

* AI Study No. 245, "Target Systems Submitted for Consideration for the Strategic Air Offensive in Support of the Objectives of the Joint Emergency War Plan, Fiscal Year 19[illegible]."

the physical vulnerability of refining facilities, and the long period of time required for reconstruction, all would make the Soviet war economy particularly susceptible to strategic air attack on petroleum refineries.

b. Ninety atom bombs (60 for the initial attack and 30 for re-attacks) delivered within 90 days with a CEP (Circular Probable Error) of 3000 feet, may be expected to leave a liquid fuels production capacity of not more than, and probably considerably less than 3.3 million metric tons per year which would be located in widely scattered small refineries, a large part of the products of which could not be effectively used by the Soviet armed forces. None of the surviving refining facilities would be capable of producing 100 octane avgas.

c. The reduction in the available supplies would, for some time, result in a decreasing rate of use of liquid fuel consuming machines rather than any sudden stoppage of their operation. Planes would fly only the most vital missions and training activities would probably be suspended. No immediate effect is to be expected on operations involving the Soviet TU-4 type bomber for possible use in an atomic bomb attack against the US and allies. However, use of this bomber would probably be curtailed by a lack of 100 octane fuel in from 6 to 18 months. Operations involving tanks and motor vehicles would be severely curtailed. The movements of naval vessels and freighters would be selectively

curtailed. However, because of the time required to complete the initial attack on petroleum installations (90 days), and the relatively short time needed to complete some of the campaigns envisaged [redacted] (for example, it is estimated [redacted] that the channel ports from Antwerp to Brest could be occupied between D + 30 and D + 60 days and the Pyrenees reached by D + 65 to D + 75 days), it is unlikely that the initial short campaigns now forecast for the Soviets would be significantly affected by any shortage of petroleum products.

25X1 25X1

REASONS FOR DISPARITY OF SOVIET AND US REQUIREMENTS

15. It is estimated that US requirements for high octane aviation gasoline for the first year of a war in 1951-52 would be roughly nine million tons. This is approximately 4 to 5 times as great as those of the Soviet Air Forces. The disparity in jet fuel requirements would be even greater. It is obvious that the two air forces must be assumed "to fight two different kinds of wars."* The main reasons for this disparity in requirements are as follows:

a. It is assumed that during 1951 Soviet forces could carry out certain of their assumed campaigns with little resistance;

b. The campaigns visualized for the Soviet forces do

not include strategic air operations as extensive as those contemplated for US Air Forces. The large scale use of medium and heavy bombers requires extremely large quantities of high octane aviation gasoline;

c. The Soviet Air Forces do not carry nearly as much cargo nor as many personnel by air transport as do the USAF.

d. The exterior lines of communication of the Soviet Air Forces will not be as long as those of the USAF. Moreover, their bases of operations will be closer to the points of air activity; and

e. The Soviet Air Forces do not carry out training programs as extensive as those of the USAF.

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* Even though the factors affecting the aviation gasoline position of the allies, Germany, and Japan in World War II are different from those which would affect the USSR in a war in 1951, the following information relating to aviation gasoline in World War II is of related interest.

ALLIED, GERMAN, AND JAPANESE AVIATION GASOLINE SITUATION IN WORLD WAR II

(thousands of metric tons)

	Stocks on Hand On Outbreak of Hostilities	Consumption During 1943	Consumption During 1944
Allies	—	12,000	22,000
Germany	500 (Aug 39)	1,800	1,400
Japan	500 (Jan 42)	600	500

Note: The allies figures are rounded to the nearest million. The others are rounded to the nearest 100,000.