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20 FEB 1964

MEMORANDUM FOR: Assistant Director, Bureau of Science
and Technology, ACDA

SUBJECT: Economic Effects of the Gain in Power
Availability from a 25 Percent Cut
in Soviet Production of U-235

1. The following comments are furnished in answer to your question: If the USSR were to cut back production of U-235 by 25 percent, what would be the gain in power availability and how useful would this gain be to the growth of the Soviet economy? As you requested, the general comments are followed by estimates for specific gaseous diffusion sites.

2. We estimate that if the USSR were to cut back the production of U-235 by 25 percent, about 8 billion kilowatt-hours (kwh) would be freed for possible use elsewhere in the Soviet economy. Such an increase in the availability of power would contribute little to Soviet economic growth in the short run. Not all of the power that would be released by a reduction in the production of U-235 could be consumed in the areas in which it would become available. Alternative consumers do not now exist, nor do sufficient transmission facilities exist to transfer the electric power to areas in which it could be used. Availability of electric power has not generally been a limiting factor in industrial growth. Facilities for consuming electric power are generally in shorter supply than facilities for producing power. It is doubtful that more than one-half of the power made available could be utilized at the present time.

3. By 1968 or 1970, however, the electric power that would be made available by a 25 percent cut in the production of U-235 could be used. It would take at least 3-5 years to build new plants to utilize the power that would be made available. Cutting production of U-235 would make it unnecessary to build powerplants to serve new consumers, if they were located in areas where the cut in production of U-235 would occur. An economy of approximately US \$200 million could be realized by not building additional powerplants that would be needed to make 8 billion kwh available.

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4. It is estimated that production of U-235 in the USSR during the current US fiscal year (July 1963 - June 1964) will cost about US \$800 million. Over half of these expenditures are for ore and feed materials. A cut of 25 percent in production of U-235 would bring economies of less than US \$100 million, and economies amounting to another US \$100 million could be achieved if there were a concomitant 25 percent cut in the production of ore and feed materials.

5. The table below shows the estimated consumption of electric power for production of U-235 in Fiscal Year 1964 for each Soviet gaseous diffusion plant, the amounts of electric power consumed by all industry in the power systems in which the gaseous diffusion plants are located, and the percent of power consumed by industry that is allocated to the production of U-235.

Estimated Consumption of Electric Power by
Gaseous Diffusion Plants in the USSR
July 1963 Through June 1964

<u>Power System</u>	<u>Consumption of Power by Industry in System (billion kwh)</u>	<u>Gaseous Diffusion Plant in System</u>	<u>Consumption by Gaseous Diffusion Plant</u>	
			<u>(billion kwh)</u>	<u>Percent of Consumption by Industry in System</u>
Urals	54	Verkhne Neyvinsk	11	20
West Siberia	26	Tomsk	6	23
East Siberia	26	Angarsk	13	50
		Zaozerniy	1	4
Total			<u>31</u>	
25 Percent Cut			<u>8</u>	

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6. The two newest Soviet gaseous diffusion plants — Angarsk and Zaoserniy — are located in East Siberia. Each is served by a sub-station of the 500 kv East Siberian network (which draws its power primarily from the Bratsk Hydroelectric Powerplant) and by a thermal powerplant on site. Angarsk is now operating at full power of about 1,600 mw, but Zaoserniy, which will probably be the same size, should start operation in early 1964. It is unlikely that the Soviets would cut production of U-235 at these plants which consume some of the cheapest power in the USSR, produced at a cost of only 4 mills per kilowatt-hour. Furthermore, at the present time there is excess generating capacity of at least 1,000 mw in the East Siberian network and another 6,000 mw is under construction. Cutting back power consumption by these two diffusion plants would therefore probably not increase industrial output. There are now no consumers for all the power that could be produced with existing capacity at Bratsk. This situation will last through 1965. Consumers for the additional 6,000 mw under construction probably will not be in full operation before 1968 or 1970. It would be even longer before the power that would be made available by a reduction in production of U-235 would be needed.

7. The Tomsk gaseous diffusion plant in West Siberia is served by a large thermal powerplant on site. If the requirements of the gaseous diffusion plant were reduced, up to 2 billion kwh could be sent to the Kuzbas over existing transmission lines. Kuzbas industry is estimated to be using about 13 billion kwh in Fiscal Year 1964. This additional power would thus increase supplies by some 15 percent. The power supply to the area in 1963 was increased by about 25 percent as a consequence of installation of new power facilities, and it seems unlikely that an additional 15 percent would be needed in the immediate future.

8. The Verkhne Neyvinsk gaseous diffusion plant now uses an estimated 20 percent of the power being consumed by industry in the Urals power system. It is estimated that consumption will increase from the present 11 billion kwh to about 16 billion kwh by 1965. The main source of power is a nearby thermal powerplant, which is being expanded to meet the additional demand. If the rest of the cut in the consumption of electric power, amounting to 6 billion kwh, were to be made at Verkhne Neyvinsk, the gaseous diffusion plant would then be operating at one-third of its planned capacity. It is unlikely that more than one-half of the additional 6 billion kwh made available to the Urals power network could be utilized at the present time. Transmission facilities are not available to distribute any more power to potential users in the Urals, Volga, and Moscow areas. Future construction of plants capable of consuming all of the power that could be made available, and of the necessary transmission lines, would require several years.

Assistant Director