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MEMORANDUM FOR: CIEP The White House

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Here are two copies of an OER contribution to the CIEP Annual Report. The sections of the contribution speak to the questions raised in Sec. 4, Section 207(a) of the International Policy Act of 1972. We did not deal with 4(d) and 4(h) because they do not apply to the USSR.

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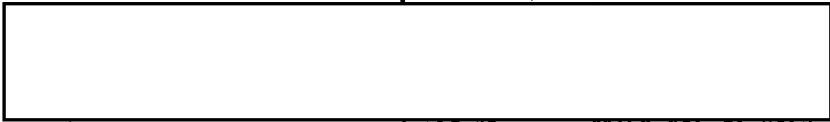
/s/



Acting Deputy Chief
SR/Eastern Europe Division

8 November 1973
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A. Research and Development Expenditures; Productivity Trends
in Industry and Agriculture

Soviet outlays on R&D are shown in Table 1. The rapid growth of expenditures is expected to continue over the next few years. No data are published on R&D expenditures by the various industrial ministries or by other sectors of the economy. Approximately 65% of total funds are derived from the state budget while the remaining 35% is generated locally as payment to R&D organizations for work performed on contract. The USSR State Committee for Science and Technology oversees the allocation of funds. The USSR's 250 key R&D projects of national importance, which always involve more than one industrial ministry, are given 25% of the total funds. The Committee divides the remaining 75% among the industrial ministries and the USSR Academy of Sciences to finance the R&D projects included in the annual R&D plan for these organizations.

Industrial growth in the USSR has been chiefly fueled by large increases in inputs of human and material resources and less so by gains in productivity stemming from improved education of workers and from the introduction of higher quality machinery. During the 1950's productivity was relatively high as the Soviets reaped the benefits of a large backlog of unapplied technology and of extensive

Table 1

Annual Expenditures for R&D

	<u>billion current rubles</u>					
	<u>1950</u>	<u>1960</u>	<u>1965</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>
Total outlays	1.0	3.9	6.9	11.7	13.0	14.2
Construction	N.A.	0.6	1.1	1.6	1.7	1.8
Current outlays	N.A.	3.3	5.8	10.1	11.3	12.4
	<u>1951-60</u>	<u>1961-65</u>	<u>1966-70</u>	<u>1971-72</u>		
Average annual rates of growth of total R&D expenditures	14.6	12.1	11.1	10.2		

borrowing of technology from abroad. As Table 2 shows, the growth of inputs remained high until the mid-1960s, but the growth of efficiency with which they were used declined after 1960. The continued low level of productivity gains after the economic reform of 1965 was one of the factors leading to the further reform introduced in April 1973 under which industry is to be reorganized into production associations. A primary objective of these associations is to accelerate technological progress by bringing R&D facilities and production enterprises under unified control.

As Table 3 shows, trends in agricultural productivity resemble those in industrial productivity. During the 1950's output grew faster than inputs, yielding relatively high rates of productivity growth. Productivity declined during 1961-65 as the result of the disastrous crop years of 1963 and 1965. A recovery of productivity growth in 1966-70 was followed by a precipitous decline in 1971-72, again as the result of a poor crop year. Despite the good crop year in 1973, it is unlikely that the goals for production and productivity contained in the 1971-75 plan will be met.

Table 2
Average Annual Percentage Rates of Growth of Industrial Production,
Factor Inputs, and Factor Productivity

	<u>1951-60</u>	<u>1961-65</u>	<u>1966-70</u>	<u>1971-72</u>	<u>1971-75 Plan</u>
Civilian industrial production	9.8	6.9	6.8	5.6	8.0
Inputs:					
Labor and capital	6.1	6.3	5.5	4.8	4.3
Labor (man-hours)	2.4	3.0	3.3	2.1	1.3
Capital	11.5	11.2	8.7	8.8	8.4
Factor productivity	3.5	0.5	1.2	0.8	3.7
Labor and capital	3.5	0.5	1.2	0.8	3.7
Labor (man-hours)	7.2	3.8	3.4	3.5	6.7
Capital	-1.5	-3.9	-1.8	-3.0	-0.4

Table 3

Average Annual Rates of Growth of Agricultural
Production, Factor Inputs, and Factor
Productivity

	<u>1951-60</u>	<u>1961-65</u>	<u>1966-70</u>	<u>1971-72</u>	<u>1971-75 Plan</u>
Output (3-year moving average)	4.8	2.8	3.4	-1.9	4.5
Total inputs	2.5	2.8	1.3	2.0	1.9
Factor productivity	2.3	-0.04	2.1	-3.8	2.5

B. Investment Patterns in New Plant and Equipment

Between 1950 and 1971 Soviet gross fixed investment grew nearly twice as fast as Soviet GNP, a reflection of the determined pursuit of economic growth on the part of Soviet leaders. The functional share of Soviet investment continues to be heavily weighted in favor of construction, although the share of equipment has been rising since 1950 (see Table 4).

The sectoral structure of Soviet investment has varied in recent years. Heavy industry has lost some ground, although it continues to maintain a wide margin as the leading claimant on investment funds. In 1965, agriculture, housing, and services were all vying for the position of second largest claimant. By 1971, however, agriculture had taken second place followed by services and housing (see Table 5).

Gross Fixed Investment by Function
(billion rubles - prices of 1 January 1969)

	1950		1960		1965		1970		1971	
	billion rubles	%	billion rubles	%	billion rubles	%	billion rubles	%	billion rubles	%
Total investment	12.8	100.0	42.0	100.0	57.0	100.0	82.0	100.0	88.0	100.0
Construction	8.6	67.2	29.2	69.5	35.8	62.8	50.3	61.3	54.7	62.2
Equipment	3.4	26.6	10.5	25.0	17.5	30.7	25.3	30.8	26.6	30.2
Other capital outlays*	0.8	6.2	2.3	5.5	3.7	6.5	6.4	7.8	6.7	7.6

* For surveys, plans, designs and the like.

Gross Fixed Investment in Consumer-Oriented and Producer Oriented Sectors

(billion rubles - prices of 1 January 1969)

	1965		1968		1971	
	<u>billion rubles</u>	<u>%</u>	<u>billion rubles</u>	<u>%</u>	<u>billion rubles</u>	<u>%</u>
Total investment	57.0	100.0	71.2	100.0	88.0	100.0
Consumer oriented	31.6	55.4	41.2	57.9	50.1	56.9
Agriculture	9.6	16.8	12.1	17.0	16.2	18.4
Consumer goods industry	2.8	4.9	4.1	5.8	4.8	5.5
Housing	9.6	16.8	12.1	17.0	14.1	16.0
Services	9.6	16.8	13.0	18.2	14.9	16.9
Producer oriented	25.4	44.6	30.0	42.1	37.9	43.1
Construction industry	1.5	2.6	2.4	3.4	3.3	3.8
Heavy industry	18.3	32.1	21.2	29.8	26.0	29.6
Transport and communications	5.6	9.8	6.4	9.0	8.5	9.7

C. Industrial Manpower and Training Practices in the USSR

In 1971, about one of every four Soviet workers was employed in industry, approximately the same proportion as in the United States. The 32 million Soviet industrial workers were employed in the following branches:

<u>Industrial Sector</u>	<u>Thousand Workers</u>
Total industry	32,030
Machine building and metalworking	12,369
Light industry	5,036
Food processing	2,903
Logging, woodworking, pulp and paper	2,829
Construction materials	2,039
Chemicals and petrochemicals	1,598
Fuel	1,513
Ferrous metallurgy	1,352
Glass and chinaware	272
Other branches	2,119

To meet the growing demand for specialized and skilled industrial manpower, Soviet educational policy at all levels places great emphasis on training that equips the individual with specific vocational, technical, or professional skills. Although the practice of forcibly drafting youths into vocational-technical schools was phased out in the early 1950's, vocational-technical education remains an important means of training youths for semiskilled jobs in industry. The number of students graduating from vocational-technical schools more than doubled during the 1960's. In 1970, graduation of workers from vocational-technical schools by branch of industry were as follows:

Thousand Persons

Total industry	410
Electrical engineering	10
Oil extraction and oil refining	14
Coal	20
Ferrous and nonferrous metallurgy	24
Chemical and petrochemical	30
Mechanical engineering and metalworking	187
Logging, woodworking, pulp, and paper	20
Building materials	6
Light	63
Food processing	24
Printing	4
Other branches	8

Despite the effort to provide widespread vocational training, many workers entering industry have only an elementary education and few industrial skills. These workers receive formal on-the-job training and are provided opportunities to enroll in various part-time education programs to upgrade their skills.

While the vocational-technical school system provides mass training in most semiskilled occupations, it does not graduate highly skilled or sub-professional workers. Such training is supplied through a system of secondary specialized schools (tekhnikums). The secondary specialized schools train technicians and various other sub-professionals who, in general, function as assistants to the professional graduates of higher educational establishments.

Professional training in the Soviet Union is provided by universities and institutes that comprise the higher educational system. Professional training in the Soviet Union differs markedly from Western patterns. First, both the total number of students trained and the number by specialty are determined by planned manpower requirements rather than by the demand of individuals for education. Second, training tends to be much more functionally oriented, and there is no program of general higher education comparable to a Western liberal arts program. Finally, the Soviet Union has relied more heavily than the United States on part-time training to provide the needed professional manpower. To be accepted by a higher educational institution, the applicant must complete secondary education, take a competitive examination, submit character references, and in most cases, have either work or military experience.

E. Export Promotion Practices

Soviet export organizations are markedly deficient in the marketing expertise required to sell manufactured products in the West. Much of this ignorance is attributable to the traditional pattern of Soviet foreign trade, whereby a major portion of Soviet exports are destined for other Communist nations under the umbrella of bilateral agreements. As a result, the composition and quantity of exports is fixed in advance and no real marketing expertise is required. Goods sold in the West traditionally have consisted largely of raw materials and semi-manufactures which can often be sold on organized commodity markets such as the London Metals Exchange. While the Soviets have become quite proficient in effecting such sales, such knowledge is largely inapplicable to the marketing expertise required to effectively compete in the highly diversified and competitive Western markets for manufactured goods.

The Soviets are concerned over the need to generate new exports to obtain the additional hard currency required to support the rapidly increasing level of Soviet imports from the West. Therefore, the USSR has begun to seriously promote the sale of Soviet manufactured goods in the West. The USSR suffers from a lack of the requisite sales and service facilities and Western uncertainties over the quality of

their manufactured goods. Soviet exports also face other impediments. Enterprises, whose production is geared for the huge domestic market and whose success is measured against their ability to meet quantitative targets, have little incentive to upgrade their production for Western markets. This attitude toward the export market on the part of plant managers has continued in spite of Moscow's use of quality bonuses and various organizational measures such as the creation of export councils at local and republic levels.

The Soviets have been active participants in Western trade fairs, although often many of the items demonstrated are in short supply and are not available for export. For certain commodities -- automobiles, tractors, some machine tools, and certain other goods -- the USSR has established foreign-based firms with sales and service facilities. While many of these firms are still getting started, the success of more established outlets has been limited by Western dissatisfaction with the Soviet product. Recently the USSR has sought direct Western assistance in marketing its products. In several major barter-type deals, for example, the Western partner is tasked with the responsibility for selling the Soviet products on Western markets. The USSR has also engaged the services of Western marketing consultants in an attempt to better assess both export potentialities and the

changes -- design, appearance, quality -- which must be made in the Soviet product lines. These initiatives will result in increased future efforts to market Soviet products in the West, but if such promotion is to be effective, Soviet producers must allocate the time and material necessary to make their products saleable in the West -- a decision which they have yet to make.

F. Export Markets, USSR

USSR Exports in 1972

Million current US dollars

	<u>To World</u>	<u>To Developed West</u>
Total	15,408	2,634
Agricultural	1,210*	333
Industrial	8,773**	1,238**
Other	5,425	1,063

* Includes estimated grain exports.

** Includes estimated exports of polished diamonds
and processed petroleum products.

G. Environmental Practices in the USSR

Environmental disruption is found in most of its varied forms in the USSR. Water pollution is the most pressing environmental problem; most major rivers, lakes, and seas receive sometimes untreated industrial and urban wastes as well as pesticides and other runoff from agricultural lands. Oil spills pose occasional threats to the environment, and thermal pollution from electric power generating facilities is present. The mismanagement of the nation's natural resources through wasteful and exploitative extraction processes is also a major problem. Although air pollution is at present of lesser importance on a national scale, local geographic features and the presence of industry often lead to pockets of pollution as serious as those in the West. Other pollution problems -- such as automobile exhaust, waste paper, and containers -- are not presently major problems in the USSR but will in all likelihood develop as the output of consumer goods increases. Legislative controls aimed at curbing environmental disruption were previously initiated at republic or local levels. Within the last few years, nationwide laws such as the Principles of Water Legislation -- which became effective on 1 September 1971 -- have been enacted.

The law attempts to set general guidelines controlling the use of the nation's water resources. Other laws have been aimed at specific problems. For example, a 17 March 1972 decree pledged 1 billion rubles by 1975 for construction of both industrial waste treatment plants and municipal water treatment facilities in an effort to clean up the Ural-Volga River Basin. The USSR contributes little to pollution control systems R&D, generally waiting until such systems have been tried elsewhere before installing them. Current technology is applicable to most Soviet problems. Generally known techniques are being used to control water pollution: for example, by increasing the flow in polluted rivers, by treating sewage and industrial effluent before discharge, and by changing industrial processes and raw materials to reduce pollutant production. In combatting air pollution, the Soviets have depended largely on dispersal to avoid the accumulation of pollutants. They are now trying to limit the generation and release of toxic materials by switching to nonpolluting raw materials and fuels and by adding standard types of exhaust controls to industrial stacks, but they have not yet shown an interest in sophisticated automotive pollution controls.

I. Long-Range Governmental Economic Planning Programs, Targets, and Objectives

Soviet economic planning takes the form of annual plans that coordinate the activities of economic units in place of the market mechanism and long-term plans of five years or more in which the basic goals and directions of economic development are set forth.

The USSR is in the midst of the Ninth Five-Year Plan (1971-75), but Soviet planners already have done preliminary work on the sub-plans for the 1976-80 Tenth Five-Year Plan and are also working on a 15 year plan for 1976-90. In 1971 the Soviet planning organization approved a plan for the development of USSR power systems to 1980.

Few details have been published concerning the long-term plans, but the 1976-90 plan is known to focus on four primary targets: a) raising the standard of living of the Soviet population; b) improving administration of the economy through better use of computers; c) formulating directions of development for each sector of the economy; and d) forecasting the technological progress that will occur in each sector of the economy as a result of basic and applied research.