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No 3

ECONOMIC INTELLIGENCE REPORT

CONSTRUCTION  
IN SELECTED HEAVY INDUSTRIES  
IN THE USSR THROUGH 1960



CIA/RR 158  
December 1958

CENTRAL INTELLIGENCE AGENCY  
OFFICE OF RESEARCH AND REPORTS

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FOREWORD

Construction of new capacity is a key factor in the rate of growth of Soviet industry. The persistent failures to achieve the goals of construction in recent years contributed to the over-all failure of the Soviet economy to fulfill the rate of growth planned for 1956, to the need for revising the plan for 1957, and to the subsequent replacement of the Sixth Five Year Plan (1956-60) by the new Seven Year Plan (1959-65).

The theses of the Soviet Seven Year Plan which have been announced recently give an outline of the goals for construction through 1965. The present report surveys the achievements and the failures in construction in selected heavy industries and attempts to determine the role of construction in the development of the Soviet economy through 1960. As such, the present analysis will serve as the basis for a subsequent report (to be published in 1959) which will examine the goals for construction under the Seven Year Plan against the background of Soviet experience to date.

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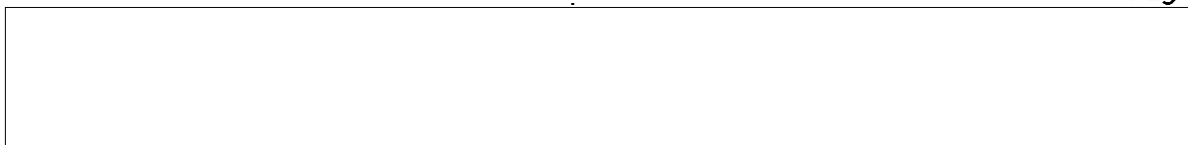
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CONSTRUCTION IN SELECTED HEAVY INDUSTRIES IN THE USSR  
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Summary

Plans for constructing and commissioning facilities in heavy industry in the USSR were not consistently fulfilled under the Fifth Five Year Plan (1951-55) or in 1956 and 1957. Apparently, construction is lagging behind plan again during 1958. The extent to which plans were fulfilled can be seen in the following data for commissioning production capacity in several important branches of heavy industry:

Branch of Industry	Percent		
	Fifth Five Year Plan (1951-55)	1956	1957
Raw iron ore	60	50	70
Pig iron	87	60	100
Crude steel	72	50	70
Finished steel	56	60	80
Coal	85	56	76
Cement	60	30	61
Petroleum (primary distillation)	67	N.A.	N.A.
Electric power stations	84	N.A.	N.A.

The most basic cause of shortfalls is that Soviet planning authorities have consistently underestimated the volume of capital investment and of construction resources required to fulfill plans. As a result, insufficient resources have been put at the disposal of construction organizations. The planning of construction programs much larger than warranted by the resources made available has resulted in the practice of dispersing investments among too many projects and prolonging periods of construction. Designs and specifications were delivered late, often after construction had been started. Tardy deliveries of production equipment also handicapped construction. Frequent shortages in supplies of construction materials, construction

\* The estimates and conclusions in this report represent the best judgment of this Office as of 1 October 1958.

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workers, and construction equipment have created problems in the conjuncture of construction activities that no amount of good management could have prevented. Thus more efficient organization of construction activity, within the resources allocated, could have provided only a partial resolution of the failure to fulfill plans for construction.

In spite of the failure to fulfill plans for commissioning new capacity in heavy industry under the Fifth Five Year Plan, production goals generally were fulfilled or exceeded. This phenomenon was at the center of the disagreement which developed in drafting the Sixth Five Year Plan (1956-60) and the plan for 1956 over the volume of investments required to support production goals.

At the Twentieth Party Congress, M.Z. Saburov (then Chairman of the State Economic Commission) asserted that production goals for 1956 were feasible and complained that the production ministries had presented inflated requests for capital investment which were not in keeping with the available resources or with the requirements of the ministries. The ministries, on the other hand, disputed the low investment allocated and emphasized the imperative need to accelerate construction work and meet construction schedules.

The difference of opinion between the central planning authorities and the ministries is demonstrated by the requests of the ministries for capital investment for 1956, 1957, and the Sixth Five Year Plan as a whole, which in each case amounted to approximately 40 percent more than the plans finally confirmed.

In December 1956 a Plenum of the Party, convened to discuss the outstanding problems in the economy in the light of failures during 1956, resolved the disagreement in favor of the central planning authorities and actually called for a reduction of capital investment in the Sixth Five Year Plan. Furthermore, the Plenum gave greater priority to fulfillment of plans for construction of housing. Finally, it stipulated that drafting of the goals for the Sixth Five Year Plan was to be completed and presented to the Supreme Soviet of the USSR in the first half of 1957.

A completed version of the plan was not submitted, however, and in September 1957 it was announced that a new Seven Year Plan would be drawn up for the years 1959-65, linking the last 2 years of the Sixth Five Year Plan with the following 5 years. The real reasons for this decision were not stated, but it is clear that the persistent shortfalls in construction for heavy industry played a large role in the virtual scrapping of the Sixth Five Year Plan.

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The Sixth Five Year Plan had anticipated considerable returns in production from construction of new capacity in heavy industry during 1956-60. Overestimation of the feasible returns in production from intensified utilization of existing capacity made the meeting of construction schedules all the more important. The fact that commissioning of new capacity during 1956 and 1957 fell short of the goals greatly lowered the chances for fulfilling plans for new capacity under the Sixth Five Year Plan and, therefore, for obtaining the returns in production which had been expected from new capacity.

Although the theses of the Soviet Seven Year Plan have been announced, a detailed statement of plans for construction of facilities in heavy industry during 1959-60, as part of the Seven Year Plan, has not yet been issued. There are, however, some preliminary indications of trouble. Construction of facilities in heavy industry has continued to lag during the first half of the transitional year, 1958. Moreover, the Seven Year Plan for commissioning housing space has been established at levels which will require more resources than provided for in the plan, particularly during 1958-60. Thus fulfillment of the plan for commissioning housing would impose a considerable drain on the resources available for construction in heavy industry, especially during 1958-60.

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I. Introduction.

Construction has played a crucial role, both positive and negative, in Soviet economic development. Although its contribution to development of the productive base of the economy has been enormous, performance in construction generally was below levels planned under both the Fourth and Fifth Five Year Plans (1946-55). One distinctive feature of construction in the period of the Sixth Five Year Plan (1956-60) of the USSR is that the perennial shortcomings in construction, long recognized but not overcome, had forced the Party and the government to begin a reappraisal of many of the goals of the Sixth Five Year Plan before the first year of the plan had expired. Thus construction is one of the most important limiting factors which must be considered in evaluating the impending Seven Year Plan (1959-65) of economic development in the USSR.

The original directives on the Sixth Five Year Plan\* indicated that the volume of state capital investment in the USSR in 1956-60 was planned to be 990 billion rubles (in prices effective 1 July 1955\*\*), or 67 percent more than under the Fifth Five Year Plan. Approximately 600 billion rubles of this investment were to be expended in construction-installation work, an increase of 60 percent more than under the Fifth Five Year Plan.\*\*\* 1/\*\*\*\*

More than 600 billion rubles of the planned 990 billion rubles of state capital investment were to be allocated for investment in industry under the Sixth Five Year Plan. Of that figure, more than 400 billion rubles were to be directed into investment in electric power stations and in the chemical, ferrous and nonferrous metallurgical, petroleum, coal, construction materials, and timber industries.† 2/ The volume of state capital investment for construction

\* References in this report to the "original directives" or the "draft" plan are to the draft Sixth Five Year Plan as adopted on 25 February 1956 at the Twentieth Party Congress.

\*\* Unless otherwise specified, data on the volume of capital investment are in terms of prices effective 1 July 1955.

\*\*\* The principal components of capital investment are (1) investment in construction-installation work and (2) investment in both fixed and mobile machinery and equipment. Other capital expenditures account for less than 10 percent of investment in the USSR. Construction-installation refers to the erection of buildings and other structures (roads, bridges, and the like) and the work entailed in installing machinery and its equipment in such structures but does not include the value of the machinery and equipment.

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† The principal construction projects (by industry) listed in the draft Sixth Five Year Plan are shown in Figure 1, following p. 6.

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of housing, schools, hospitals, theaters, and other municipal facilities was to total more than 200 billion rubles.\* 3/

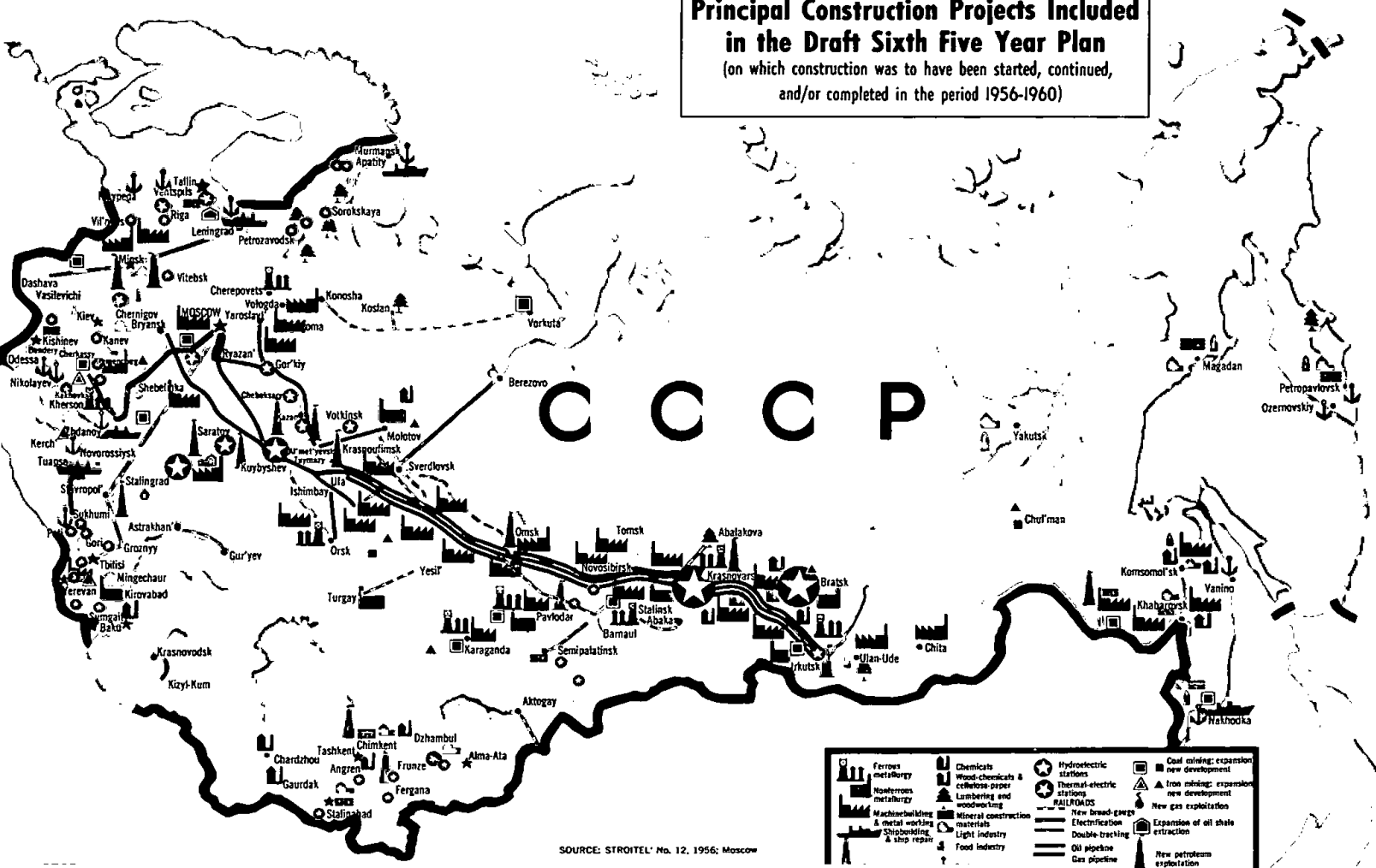
Preferential development of the base in heavy industry in the USSR has been and continues to be a constant aim and concern of the Party and the government. Much of the development of heavy industry achieved in the past was provided by construction and installation of additional productive units at established enterprises and by construction of new enterprises. The importance of fulfilling the goals established for construction in various heavy industries under the Sixth Five Year Plan is revealed by the degrees to which the increases in production called for by the draft plan were to be obtained from additional productive facilities commissioned\*\* during 1956-60 (in approximate percentage of the increase in production planned for 1960 above 1955, as follows) 5/:

<u>Selected Products</u>	<u>Percent</u>
Construction materials	
Cement	68
Asbestos-cement shingles	44
Soft roofing	73
Window glass	14
Ferrous metals	
Pig iron	65
Crude steel	53
Rolled ferrous metals	60

\* The greater part of the 200 billion rubles was included in the 600 billion rubles planned for investment in industry, so that these figures are not additive.

\*\* In this report the term construction and commissioning, or simply commissioning, of additional capacity will include only the additions to capacity which are made by way of capital investment in the construction of new plants and expansion or modernization of existing plants. The draft Sixth Five Year Plan did not define clearly the terms of reference outlined for the industries indicated. In the cement industry, however, it is known that 32 percent of the planned increase in production was to be obtained not only from the "better organization of production and more efficient utilization of existing production capacity" called for in the draft directives but also from modernization, reconstruction, and expansion of existing plants. Thus 68 percent of the increase in production of cement was to be provided by entirely new cement plants completed during 1956-60. 4/

**USSR**  
**Principal Construction Projects Included**  
**in the Draft Sixth Five Year Plan**  
 (on which construction was to have been started, continued,  
 and/or completed in the period 1956-1960)



SOURCE: STROITEL' No. 12, 1956; Moscow

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<u>Selected Products</u>	<u>Percent</u>
Nonferrous metals	
Refined copper	58
Zinc	53
Lead	66
Aluminum	80
Nickel	40
Coal	65
Other	
Hydraulic turbines	46
Automobiles	45
Excavators	52
Chemical equipment	65
Forge-press machines	71
Electric locomotives	60

A survey of achievements and problems in construction in several key heavy industries, therefore, should provide a means for testing the feasibility of some important goals for construction and thereby provide one of the bases necessary for determining the feasibility of some of the important goals in industrial production.

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## II. Construction Materials Industry.

By investing in the construction of enterprises which produce construction materials, the construction materials industry of the USSR is investing in its own productive base. Construction organizations, therefore, should display a tendency toward superior performance in construction of enterprises to produce construction materials. For many reasons, this tendency has not occurred in the USSR. In fact, even those construction organizations formerly under the jurisdiction of the Ministry of the Construction Materials Industry have failed consistently to meet their construction schedules.

Although many new plants for producing cement, precast reinforced concrete products, and other construction materials were built in the years after World War II, construction of such enterprises has lagged behind the tasks assigned by the state. 6/ As a result, the inadequate productive bases of construction organizations and inadequate production capacity of the construction materials industry have continued to be serious handicaps in meeting construction schedules, fulfilling the planned volumes of work, and achieving a desirable and feasible level of efficiency in the construction industry.

### A. Cement.

In retrospect, the overwhelming importance accorded the construction of new cement plants in the draft Sixth Five Year Plan (1956-60) of the USSR must be attributed in great part to the attitude prevailing at the Builders' Conference in December 1954. In his speech to the builders, Khrushchev voiced the change in policy as follows: "In developing the building materials industry, we have until recently been wrong in stressing the building of brickyards at the time when we needed to develop the cement industry in every way." 7/

The draft Sixth Five Year Plan provided that 68 percent of the planned increase in production of cement in 1960 above that in 1955 was to be obtained by construction of new cement plants. Therefore, 27 new cement plants were to be completed under the Sixth Five Year Plan,\* the majority of them to have a capacity of 1 million or more tons\*\* per year. 8/

Construction of new cement plants has been and continues to be an important means for obtaining a rational, regional distribution

\* Construction of a number of these plants had been started before the Sixth Five Year Plan.

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

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of production in conformance with the requirements of underdeveloped areas in the USSR. Of the 27 new plants, 17 were to be built in the eastern areas of the USSR, and the remaining 10 were to be built in the western areas, as follows 9/:

<u>Eastern Areas</u>		<u>Western Areas</u>	
RSFSR	12	RSFSR	7
Kazakh SSR	4	Georgian SSR	1
Turkmen SSR	1	Ukrainian SSR	1
		Moldavian SSR	1
Total	<u>17</u>		<u>10</u>

In the period since World War II, new cement plants were constructed and put into operation in the Urals (at Magnitogorsk, Nizhniy-Tagil, Novo-Pashiysk, and Orsk); in Siberia (at Krasnoyarsk and Timlyuy); and in Kazakhstan (at Karaganda and Sas-Tyuba). A number of new plants which were to have been completed in the eastern areas under the Fifth Five Year Plan (1951-55) were carried over into the period of the Sixth Five Year Plan. 10/ A serious lag in construction has prevailed in the cement industry throughout the USSR and is not peculiar to construction in the eastern areas.

1. Construction of Productive Facilities.

The draft Sixth Five Year Plan stipulated that annual capacity to produce cement would be increased 40 million tons by the end of 1960 (3 times the increase achieved under the Fifth Five Year Plan) to a total capacity of 67 million tons, about 2.5 times the capacity at the beginning of the Sixth Five Year Plan. This increase was to be achieved by constructing new cement plants, by expanding existing plants, by modernizing equipment, and by intensifying the productive processes.\* 11/ The Fifth Five Year Plan, on the other hand, had called for the capacity of the industry to be increased to approximately 2.1 times the level at the beginning of the plan, but this goal was not achieved, primarily because of failures to construct and commission on schedule the additional facilities planned. 12/

\* Thus not all of the planned increase in capacity was to be obtained from capital investments in the construction and/or installation of additional facilities. For example, capacity in the cement industry was increased by approximately 5 million tons under the Fifth Five Year Plan without significantly taxing investment resources -- that is, by improved organization of production, technical innovations, capital repairs, and the like.

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In every year of the Fifth Five Year Plan the commissionings of additional capacity were not fulfilled as scheduled. 13/ Moreover, in the 7 years 1950-56 the planned construction and commissionings of additional capacity to produce cement were fulfilled by only 52.8 percent. 14/ Although commissioning of capacity was not fulfilled under the Fifth Five Year Plan, the increase planned in production of cement was achieved. 15/ Consistent shortfalls in the construction and commissionings of facilities to produce cement, however, put the industry on tenuous ground for the start of the Sixth Five Year Plan. Because a much greater share of the increase planned in production of cement was to be obtained from the construction of new cement plants alone, the lag in construction of new plants presented a proportionally greater handicap to achieving the goals of production in the industry under the Sixth Five Year Plan than under the Fifth Five Year Plan. 16/ This problem existed in 1955, although to a lesser extent than later.

a. 1955.

The revised plan for 1955 stipulated that production of cement would be increased 22 percent in 1955, with approximately 60 percent of the increase to be obtained from improved utilization of existing capacity. 17/ Of the planned increase of 4 million tons in production of cement, approximately 1.6 million tons, or 40 percent, of the increase was to come from facilities to be commissioned in 1955.

The failure to commission on schedule the planned additions to capacity of the industry in 1955, therefore, contributed to a shortfall in production of approximately 500,000 tons of cement in 1955. 18/ Of the 3 or 4 ministries which were then the largest contractors in construction for the cement industry, the Ministry for Construction of Metallurgical and Chemical Industry Enterprises fulfilled its plan for commissioning capacity to produce cement by only 46 percent in 1955, and the Ministry of Construction completed only 20 percent of its plan during the first 9 months of 1955. 19/

b. 1956.

The plan for 1956 called for state capital investment in the cement industry\* to be more than double that of 1955. Additional investment apparently was allocated later in 1956;

\* In this report, data on investment in given industries include investment in both productive and nonproductive facilities (for example, workers' housing), unless specifically stated as investment in productive facilities only.

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nevertheless, the investment plan was underfulfilled.\* 20/ In the very first year of the Sixth Five Year Plan, therefore, shortfalls in construction for the cement industry were particularly severe.

The plans for commissioning capacity to produce cement in the first half of 1956 were not fulfilled by construction organizations of the Ministry of the Construction Materials Industry, the Ministry of Construction, and the Ministry for Construction of Metallurgical and Chemical Industry Enterprises. 21/ The Ministry of Construction was slated to commission additional capacity of more than 1 million tons in the first half of 1956, but none of this was accomplished. 22/ In fact, the Ministry achieved no more than half of its planned commissionings in the year as a whole, whereas the Ministry for Construction of Metallurgical and Chemical Industry Enterprises, although behind schedule, did fulfill its planned commissionings for the year, accounting for more than 60 percent of the commissionings achieved for the entire cement industry. 23/

By the end of September 1956, therefore, the progress achieved in construction for the cement industry was distinctly inadequate. The share of construction work completed at the new cement plants by the end of September 1956 indicates that, of four new cement plants which should have been in operation already, only the Rustavi plant had been commissioned. (See Figure 2.\*\*)

By the end of 1956, only 1 of the 5 new cement plants which were to have been commissioned in 1956 was completed.\*\*\* 25/ Along with the lag in construction at existing plants, therefore, the plan for construction and commissioning of additional capacity to produce cement was fulfilled by only 30 percent in 1956. The shortfall in commissionings amounted to 3.7 million tons of capacity. 26/ Of a plan calling for commissioning approximately 5.3 million tons of capacity in 1956, it is estimated that only 1.6 million tons were achieved.

The lag in construction of additional facilities in 1956 directly impeded fulfillment of the plan for production of cement that year. During the first 8 months of the year, production

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\* This fact is deduced from data on the declining production of clinker per million rubles of productive capital stock in the cement industry.

\*\* Following p. 12. Part of the construction of additional capacity under way at some existing plants also is shown. All these facilities were to have been commissioned in the fourth quarter of 1956 but were far behind schedule. 24/

\*\*\* The new Irkutsk cement plant is not shown on the map, because its output was not planned to be significant in 1956.

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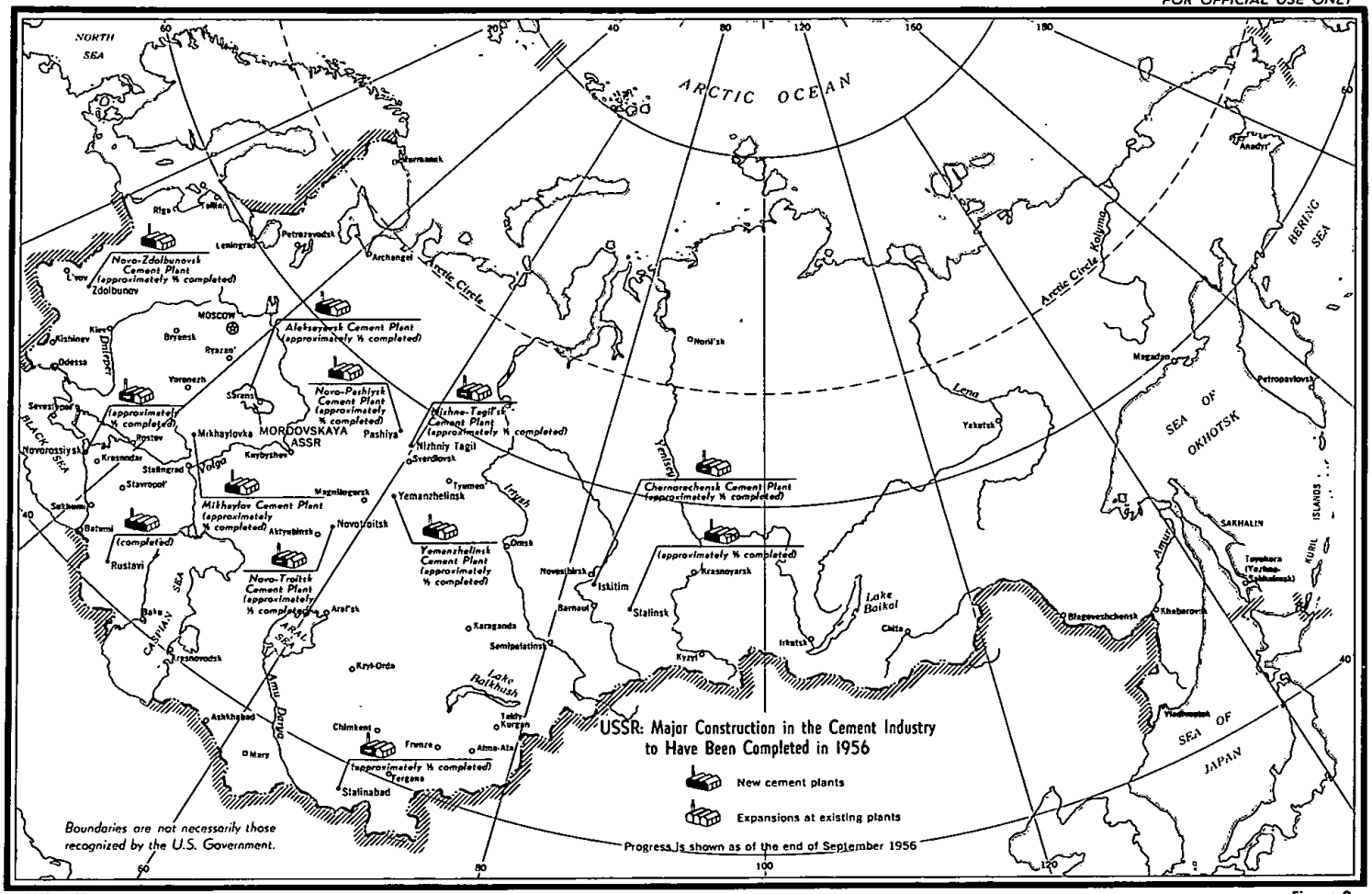


Figure 2

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of cement from facilities which were to have been commissioned earlier in 1956 was to have amounted to more than 1 million tons, but less than 100,000 tons was so obtained. 27/ By the end of the year the lag in commissionings entailed a cumulative shortfall in production of cement of 1.1 million tons, or 60 percent of the total underfulfillment of production planned for 1956. 28/

Lazar Kaganovich, then Minister of the Construction Materials Industry, issued two decrees late in September 1956 which outlined urgent measures, as follows: (1) to improve the operation of existing cement plants and (2) to accelerate the construction and commissioning of new facilities to produce cement. The latter stipulated that capacity totaling 1,375,000 tons was to be commissioned by the Ministry of the Construction Materials Industry alone in the fourth quarter of 1956. Kaganovich also appointed his deputy minister to supervise the fulfillment of planned construction of facilities to produce cement by other ministries. 29/ The Ministry of the Construction Materials Industry had little success in carrying out Kaganovich's decree on construction in the fourth quarter of 1956. In 1957, little success in construction for the cement industry was achieved.

c. 1957.

The revised national economic plan for 1957 was one of moderation and retrenchment of rates of growth in the Soviet economy. Construction resources were to be concentrated on the most important projects and on those nearing completion, and the number of new construction projects was to be minimized. The general policy of concentration was implemented in construction for the cement industry, at least in the early part of 1957. A proposal that the plan for 1957 provide for construction to begin on a new cement plant in the Kermine district of Uzbek SSR apparently was rejected in conformance with this policy. 30/ Moreover, concentration of resources certainly facilitated the commissioning of 3 new cement plants in the first quarter of 1957, although all 3 were to have been commissioned in 1956. 31/

In view of the sizable failures in 1956, the revised plan for 1957 called for accelerating the completion of facilities to produce cement. Six new cement plants were to be completed in 1957 (3 of them in the first quarter),\* as were additional production lines at 12 other plants. A total of 5.9 million tons of additional capacity was planned to be commissioned in 1957, 32/ but this figure was

\* The Alekseyevsk, Yemanzhelinsk, Novo-Zdolbunovsk, Irkutsk, Kuybyshev, and Semipalatinsk plants.

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only a nominal increase above the level of commissionings which had been called for in the plan for 1956. Later in 1957 the goal was raised to 7.2 million tons of additions 33/ and still later was lowered somewhat to 6.9 million tons. In conjunction with the latter goal, the plan was that capital investment in the cement industry during 1957 would total more than 1.5 billion rubles. 34/

The three new cement plants -- Alekseyevsk, Yemanzhelinsk, and Novo-Zdolbunovsk -- which had been scheduled to be operative in 1956 were finally commissioned in the first quarter of 1957. Along with the completion of some additional production lines at existing plants, therefore, the quarterly plan for commissionings in the cement industry was slightly exceeded. Capacity totaling 2,579,000 tons of cement per year was commissioned, whereas only 2,551,000 tons had been planned. 35/

By the end of the first half of 1957, more than 3 million tons of additional capacity had been commissioned, but this amount was considerably less than that planned for the half-year period. 36/ Less than 600,000 tons of additional capacity had been commissioned by the end of the second half of 1957, even though the new Irkutsk cement plant was commissioned near the end of the year, bringing the total commissionings for the year to 3.6 million tons of capacity. 37/ This figure represented only 61 percent of the 5.9 million tons initially planned.

The commissionings planned for 1957 were expected to yield more than 2 million tons in increased production of cement during the year.\* In spite of the fact that commissionings were below the planned level, the revised plan for production of cement was exceeded in 1957\*\* 38/ in contrast with 1955 and 1956, when shortfalls in commissionings caused production to fall below the planned levels.

In sum, 1957 was a year of failures and significant achievements in construction for the cement industry. Although 3 new cement plants were commissioned in the first quarter of the year, only 4 of the 6 new plants planned had been commissioned by

\* This achievement depended on the higher goal for commissioning 6.9 million tons of additional capacity.

\*\* The revised production goal set for cement in 1957, although 14.7 percent above the level of production achieved in 1956, was more than 1 million tons below the level initially planned for 1957 in conjunction with the draft Sixth Five Year Plan. Although the revised plan for 1957 for production of cement was exceeded, the initial plan was not. 39/ The failure to fulfill the plan for commissioning additional production capacity in 1957 as in 1955-56 was directly responsible for much of the failure to fulfill the initial plan for 1957 for production of cement.

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the end of 1957. New production lines were completed at only 7 of 12 plants. 40/ The end result was that the additional capacity commissioned during 1957 no more than made up for the shortfall in commissionings during 1956.

d. 1958.

The plan for 1958 stipulates that more than 2 billion rubles are to be invested in the cement industry, an increase of more than 33 percent above investment in 1957. Approximately half of this investment is scheduled for the cement projects (new plants and expansions) which are to be commissioned in 1958. Almost 7.5 million tons of production capacity is planned for commissioning during the year.\* Three new cement plants are to be commissioned -- the Semipalatinsk and Chimkent plants in Kazakhstan and the Kuybyshev plant. Both the Semipalatinsk and Kuybyshev plants were to have been commissioned during 1957. The plan for 1958 also calls for additional facilities to be commissioned in the plants at Kuznetsk, Krasnoyarsk, Spassk, Teploye Ozero, Karaganda, Magnitogorsk, Irkutsk, Nizhniy Tagil, and elsewhere. The first five of those listed also were to have been commissioned in 1957. Construction of two new cement plants is to be started in 1958 -- the Angren plant in Uzbek SSR and the "Noviy Spartak" plant in Ryazan Oblast. 41/

Although the first production line at the Kuybyshev plant and additional capacity at 5 other existing plants were to be commissioned during the first quarter of 1958 (according to the plan for 1958), progress during the first 2 months precluded fulfillment of this goal. Moreover, progress of construction at other cement projects during the first 8 months of 1958 has been discouraging, and probably even the initial goal for commissionings in the cement industry will not be fulfilled in 1958. 42/

2. Problems in Construction.

Protracted periods of construction have been a particularly troublesome problem in construction of cement plants. By the beginning of the Sixth Five Year Plan, compulsory norms for the duration of construction of cement plants had been worked out, confirmed, and put into use. New cement plants were to be built in not more than 40 to 48 months, depending on the planned capacity of the plant and on whether or not a construction-installation organization was already operating in the given city or region.\*\* 43/

\* The plan was raised later to 10.2 million tons.

\*\* Such norms for the period of construction were defined to include the entire period from the beginning of preliminary construction work to commissioning of the first production [footnote continued on p. 16]

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The Sebryakovo and Rustavi cement plants were said to have been built in 2-1/2 to 3 years.\* 44/ The Irkutsk plant, commissioned at the end of 1957, was constructed in approximately 3 years. 45/ The draft Sixth Five Year Plan obviously had anticipated that most of the new cement plants would be constructed in 3 years or less. 46/

As a rule, however, construction of new cement plants in the past has dragged on for 6 to 8 years. 47/ Of cement plants completed or to be completed under the Sixth Five Year Plan, the Yemanzhelinsk and Alekseyevsk plants, completed early in 1957, had been under construction for 8 years. 48/ If completed as planned in 1958, the Semipalatinsk plant will have been under construction 6 to 7 years. 49/ The plan for 1958 also calls for completion of the Chimkent plant, which is in its fifth year of construction. The rate of construction at Chimkent, though quite slow in 1956, improved during 1957, but problems in the delivery of designs and materials remain in 1958. 50/ The Topkinsk cement plant had been under construction 4 years by the beginning of 1958 and is not yet scheduled for completion by the end of 1958. 51/ It has not been unusual for expansions of existing plants to drag out over 3 to 4 or more years, as occurred at the Krasnoyarsk and Pervomaysk cement plants. 52/

The reasons for protracted periods of construction are numerous. One of the most important is the low ratio of capital investment which is allocated and/or achieved year by year to the total estimate cost\*\* of the project. The norms set for the duration of construction of cement plants, therefore, were supplemented by norms for the distribution of capital investment. In constructing a cement plant in a city or region with a construction organization at its disposal, capital investment in the first year of construction was to constitute 20 percent of the estimate cost of the project, 35 percent in the second year, 40 percent in the third, and 5 percent in the

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line of the enterprise. Preparation of designs, specifications, and estimates; drainage of territory; and selection of deposits of local building materials were not included as preliminary work. Presumably, demolition work in clearing the site also was excluded.

\* The definition of the construction period is not always strictly applied in the Soviet press, so that actual periods of construction are at times stated with less than desirable clarity.

\*\* Estimate cost is the Soviet term used to express the anticipated (estimated) cost of a construction project and is based on a system of planning prices and norms for wages, production of construction workers, and overhead costs and includes planned profits and other planned accumulations of the contractor.

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fourth year.\* Along with such norms, changes during the year in the design of the plant or subprojects or in the construction schedule were to be precluded. 53/

The norms for the yearly distribution of capital investment are violated as frequently as those for the construction period. During 6 years of construction, only 24 percent of the estimate cost of work at the Yashinsk cement plant had been performed. Only 17 percent of the capital investment for expansion of the Krasnoyarsk cement plant had been made after 3 years of construction. 54/ During approximately 4 years of construction of the Semipalatinsk cement plant, only 10 percent of the required capital investment was made, and after more than 6 years of construction, work amounting to only 21 percent of the estimate cost had been performed. 55/ Even the case of Slantsy cement plant, construction of which apparently was started in the first year of the Sixth Five Year Plan, had capital investment approved for 1956 amounting to less than 7 percent of the estimate cost of construction. 56/

Blame for the slow rates of construction of cement plants can be placed on nearly every organization concerned -- the client organizations making the investment in cement-producing facilities, the financial organs, the contract construction organizations performing the work, the former construction ministries, and other planning organizations of the state and the Party. 57/ Because construction resources are scarce, the responsibility for the slow rates of construction lies on those who have awarded priorities for the construction of cement plants -- priorities which are too low to insure the timely completion of planned construction. 58/

The former construction ministries have been criticized for paying inadequate attention to development of the cement industry, even though they were the principal consumers of cement. The volume of construction performed by the Ministry of Construction in the erection of cement plants under the Fifth Five Year Plan was only 1.4 percent of the total volume of construction performed by this ministry; in 1956 the volume planned was to be only 1.7 percent. The effort made by the Ministry for Construction of Metallurgical and Chemical Industry Enterprises was proportionally smaller -- 0.34 percent under the Fifth Five Year Plan and 0.7 percent in 1956. 58/

The relatively insignificant shares of their total volumes of work  
\* Where a construction organization did not exist previously and where the productive base for building a cement plant must be built simultaneously with the cement plant, capital investment was to be 15 percent of the estimate cost in the first year, 35 percent in the second, 35 percent in the third, and 15 percent in the fourth.

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committed to construction for the cement industry probably contribute to laxity on the part of the construction ministries. At least two sides to the question of responsibility, however, appear:

(a) underfulfillment of plans for construction of cement plants by the construction ministries, in spite of adequate allocations of capital investment by the client organizations, and (b) insufficient allocations of investment by the client organizations.

Other problems in construction of cement plants can be found in the deficient organization of material and technical supply.\* The institutes (under the Ministry of the Construction Materials Industry) which design cement plants and issue technical specifications have been criticized roundly for consistent failures to meet deadlines for delivery of designs and specifications to construction organizations. Designs and specifications for a large volume of construction work frequently are delivered to the site, but the working drafts for those projects which must be started first are not available. Moreover, not only are designs delivered late, but often they contain many errors. 59/ Construction is frequently handicapped, both before and after the start of construction, by revisions in designs and plans -- location of the plant, designed capacity, selection of equipment, and other changes in designs -- initiated by the design institutes, by the client organization, or even by the construction organization. 60/

According to a Soviet newspaper, many letters and telegrams from construction sites to the central organs testify to a shortage of construction materials as a continuing problem at many cement projects. 61/ Intermittent shortages in supply of materials also are a continuing problem -- for example, the supply of sand and stone at a given site may be sufficient and the supply of lumber deficient, but by the time the lumber has arrived the supply of sand is exhausted. Shortages of building materials give rise to excessive idling of construction workers on the site. At other cement projects, construction workers themselves are in short supply. 62/

Tardy deliveries of machinery and equipment also have handicapped the scheduled completion of cement plants and appear to be a serious threat to future completions. In the past the USSR has depended heavily on the receipt of equipment for cement plants from other nations, especially East Germany. The size of the problems encountered as a consequence is implicit in the criticism of the former Ministry of the Construction Materials Industry for having been

\* Material and technical supply includes the drawing-up and delivery of designs and technical specifications and the supply of construction materials and equipment.

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"recklessly unconcerned" about the development of domestic production of such equipment. Present plans call for the start of domestic production in 1958 and complete self-sufficiency in 1961. 63/

Some cement plants have been commissioned even though some subsidiary production departments of the given enterprise were not completed. Poor quality of construction and deviations from specifications have resulted in structural failures at some cement plants. 64/ Such practices obviously delay the effective operation of the commissioned enterprise.

3. Revision of the Draft Sixth Five Year Plan (1956-60).

More than 10 million tons, or 32 percent, of the increase in annual production of cement planned in the draft Sixth Five Year Plan was to be obtained by reconstruction and expansion of existing plants, greater utilization of existing capacity, and better organization of production. Construction of new cement plants, on the other hand, was to provide for 22 million tons of the planned increase in production.\* 65/ To meet this requirement from new construction, 27 new plants were to be completed under the Sixth Five Year Plan. 68/ Thus the average contribution to the production of cement per new plant would be more than 800,000 tons per year, and the average new plant would have a capacity of 900,000 to 1 million tons per year.

The enthusiasm displayed by planning organizations toward construction of huge, new cement plants under the Sixth Five Year Plan obviously was based on the following: (a) regional developmental programs and (b) design studies indicating lower original capital investment per ton of annual capacity, lower production costs, and higher productivity per worker, the larger the plant. 69/ Such enthusiasm was not based on an accurate analysis of the past record in building new cement plants, or of the volume of construction resources required to build the plants on schedule, or of the possibilities of expanding existing plants.

Expansion or modernization of existing cement plants generally requires considerably less capital expenditure per ton of added capacity than construction of new plants. Therefore, as one

\* Various interpretations of these relationships have been made. The report of Bulganin on the Sixth Five Year Plan, for example, indicates confusion on the part of Gosplan, USSR, in this respect. 66/ The statement made in the official technical journal on the cement industry is accepted in this report as the most accurate; additional support is suggested in an article on the prospective development of the cement industry. 67/

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Soviet analyst noted, the possibilities of expanding existing plants should be considered first and foremost in working out prospective plans for development of the cement industry. New plants should be constructed, as a rule, only when possibilities of expanding plants are inadequate to meet the increasing requirements for cement in a given area or when it is necessary to bring the production of cement nearer to the points of consumption. 70/

The record of construction of additions to capacity under the Fifth Five Year Plan was a serious challenge to the feasibility of completing 27 new, large cement plants during the period of the Sixth Five Year Plan. The continued failures to meet the plans for commissioning additions to capacity in 1956 and 1957 indicate not only that the volume of construction put in place at cement plants carried over from the period of the Fifth Five Year Plan into the Sixth was insufficient to support the plans for completions in 1956 and 1957 but also that the volume of construction put in place by the end of 1957 was quite insufficient to support the goal for commissioning additions to capacity under the Sixth Five Year Plan. The record to the end of 1957 and the requirements to fulfill the draft Sixth Five Year Plan are presented in Table 1.\*

Table 1\* shows that only 15 percent of the estimated commissionings of additions to capacity under the Sixth Five Year Plan had been attained by the end of the first 2 years of the plan, whereas the plans for 1956 and 1957 had called for a minimum of 33 percent.

The Plenum of December, 1956 elaborated on the necessity of bringing the overambitious construction program in the entire Soviet economy into line with the available material and financial resources. The revised plan for 1957 for the cement industry, however, called for an accelerated rate of construction and completion of productive facilities compared with that attained in 1956. Even so, acceleration of construction during 1957 was not sufficient to insure completion of the 27 new cement plants during 1956-60. A survey of the construction at individual cement plants indicates that, of the 27 new plants to be built, construction of 11 to 13 probably would not have been started before 1959. Of the other 14 to 16 plants, the construction record through the 1958 plan was as follows:

	<u>Number of Plants</u>
Completed by the end of 1957	5
Still under construction by the end of 1957 (three of which are to be completed in 1958)	7 to 9
Construction to be started in 1958	2
Total	<u>14 to 16</u>

\* Table 1 follows on p. 21.

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Table 1

Commissioning of Annual Capacity for Cement in the USSR  
 1946-60

Years	Actual (Million Metric Tons)	Plan (Million Metric Tons)	Fulfillment of Plan (Percent)
Fourth Five Year Plan (1946-50) a/	6.3	N.A.	N.A.
Fifth Five Year Plan (1951-55) b/	8.3	14	60
1951-56 c/	9.9	19	53
1956 d/	1.6	5.3	30
1957 e/	3.6	5.9	61
1958		7.5 f/	
Average yearly requirement, 1958-60		9.6 g/	
Sixth Five Year Plan (1956-60) h/		34	

a. 71/

b. The datum indicating 8.3 million tons of commissionings is from source 72/. The fulfillment of 60 percent and the plan of 14 million tons is estimated as outlined in footnotes c and d, below.

c. The actual commissioning of 9.9 million tons is the sum of the 8.3 million tons achieved in 1951-55 and the estimated 1.6 million achieved in 1956. See footnote d, below.

d. In 1956 the plan for commissionings was fulfilled by only 30 percent; the shortfall in commissionings amounted to 3.7 million tons of capacity. 73/ Thus it is estimated that commissionings of 5.3 million tons were planned and 1.6 million tons achieved in 1956.

Reportedly, the plan for commissionings during the 7-year period 1950-56 was fulfilled by only 53 percent. 74/ Data on actual commissionings are available for the 6-year period 1951-56. It is therefore presumed that the 53-percent fulfillment of the plan for the 7-year period 1950-56 can reasonably be applied to the 6-year period 1951-56 without significantly distorting the actual, but unknown, fulfillment. In other words, the year 1950 can be ignored safely. Under this assumption, the commissionings planned during 1951-56 are estimated at about 19 million tons of capacity. The Fifth Five Year Plan for commissionings therefore can be estimated at 14 million tons of capacity, which is 2.2 times the commissionings achieved under the Fourth Five Year Plan. This figure is at

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Table 1

Commissioning of Annual Capacity for Cement in the USSR  
1946-60  
(Continued)

least consonant with what might be expected in view of the plan to increase the capacity of the cement industry under the Fifth Five Year Plan to 2.1 times the level of 1950. 75/

e. Actual commissionings were 3.6 million tons. The earliest statement of the plan for 1957 was 5.9 million tons of capacity, but later announcements indicated plans for 7.2 and 6.9 million tons. 76/ If the latter plans are used, fulfillment in 1957 would be lowered from the 61 percent given in the table to 50 percent and 52 percent, respectively.

f. As indicated in the text above, the plan was raised later to 10.2 million tons. 77/

g. The average yearly commissioning required in the last 3 years of the Sixth Five Year Plan was determined from the difference between the estimated goal of the draft Sixth Five Year Plan and the sum of commissionings achieved in 1956 and 1957.

h. Annual production capacity in the cement industry was to be increased 40 million tons by the end of the Sixth Five Year Plan. 78/ An estimate that at least 84 percent of this planned increase, or about 34 million tons of capacity, was to be achieved by constructing and commissioning additional facilities is believed to be a conservative one. As already indicated, 32 percent of the planned increase in production of cement in 1960 compared with production in 1955 was to be obtained from expansions of existing plants and other means (excluding new plants completed during 1956-60). 79/ It is estimated that at least one-half of the 32-percent share was planned to be obtained from expansions of existing cement plants. The 68-percent share from construction of new cement plants, plus an estimated 16 percent from expansions, gives an estimated total of at least 84 percent of the planned increase in production to be obtained from expansions of existing plants and construction of new plants. In a like manner, it therefore is estimated that at least 84 percent of the increase in capacity planned under the Sixth Five Year Plan was also expected to be obtained from construction and commissioning of additions to capacity in the industry during the period.

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It is not surprising, therefore, that in June 1957 the construction of new cement plants under the Sixth Five Year Plan was given considerably lower priority than in the original directives on the plan. The new direction was revealed in the statement that the increase of 40 million tons in capacity under the Sixth Five Year Plan was to be obtained primarily from intensification of production, improvement of technological processes, the replacement of old or installation of new equipment, reconstruction of existing facilities, and also by expanding existing plants.\* This proposed shift in emphasis substantiates the impracticability of the original decision to obtain about 68 percent of the planned increase in cement production from new cement plants completed during 1956-60.

The failures to commission planned additional capacity in each of the 3 years 1955, 1956, and 1957 caused much of the under-fulfillment in production planned for those same years. Because of the continued failures in construction of new cement plants and a shift toward relying primarily on development of additional capacity at established plants, the goal of the draft Sixth Five Year Plan of producing 55 million tons of cement in 1960 has been reduced to 52 million tons. Along with this, the number of new plants to be completed under the Sixth Five Year Plan has been reduced from the original 27 to 16. 81/

A reduction of about 40 percent in the number of new plants to be completed, in conjunction with a mere 5-percent reduction in the production goal for 1960, implies that little if any reduction was made in the original goal for commissioning of capacity during the period of the Sixth Five Year Plan. It means, rather, that a large compensatory increase in the volume of additions to existing plants would seem to be required. In view of the habitually tardy deliveries of designs and the inadequate capacity of designing organizations, the required shifts in plans probably will be costly in both money and time. The past record of lagging construction at projects being expanded in the cement industry also raises the question of the feasibility of a large compensatory shift into expansion of facilities.

\* There seems to be some indecision about the planned degree of shift in emphasis. It has been stated that the increase in production (or capacity) of cement plants scheduled for 1959-65 should be obtained as follows: 12.2 percent from modernization of existing equipment and intensification of production, 28.9 percent from expansion of established plants, and 58.9 percent from construction and commissioning of new plants. 80/ If such indecision is not resolved expeditiously, serious shortfalls in construction for the cement industry seem inevitable for the 7-year period 1959-65.

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As indicated above, of the presently planned 16 new plants, only 5 had been completed by the end of 1957, and 3 more are planned for completion in 1958, leaving 8 for completion in 1959-60. Construction of two of the new plants must be started in 1958. If only because of previous lags in construction of new cement plants, successful completion of all 16 new plants is doubtful. Construction for other branches of heavy industry, however, also has lagged seriously behind the goals of the draft Sixth Five Year Plan. Therefore, the demands on the available construction resources are still excessive. The cost to the economy of priority reallocation to the cement industry of those construction resources which are interchangeable among the different types of construction for heavy industry must be appraised carefully. The new goal of producing 52 million tons of cement still depends heavily on the successful completion of the construction program, and, therefore, serious doubt exists that even the revised plans for construction in the cement industry can be fulfilled.

B. Precast Reinforced Concrete Components.

By the end of 1957, annual production of precast reinforced concrete components\* in the USSR had been increased to approximately 10 times that of 1950. 82/ Much of the impetus for this rapid development of the industry was contributed by two decrees on precast concrete -- one of 26 January 1952 and the other of 19 August 1954.

1. Construction of Productive Facilities and Production, 1955-57.

The decree of 19 August 1954 provided that during 1955 and 1956 construction organizations were to build a total of 402 plants and 200 casting yards\*\* for production of precast concrete. Capacity to be commissioned was to total 2,844,000 cubic meters (cu m) of products in 1955 and 4,855,000 cu m in 1956. Capital investment then planned for the precast concrete industry, 1.7 billion rubles for 1955 and about 2.2 billion rubles for 1956, 83/ indicates the high priority awarded by the decree to development of the industry.\*\*\*

\* The abbreviated term precast concrete will be used in this report.

\*\* Enterprises for producing precast concrete are of two general types: (1) the usual type of plant or shop built for year-round operation and (2) the casting or open-yard type, which is erected with relative ease compared with the plant type.

\*\*\* These data on investment are not in prices of 1 July 1955. A rough comparison with capital investment of approximately 1 billion rubles made in the cement industry during 1956 shows planned investment in the precast concrete industry to be considerably greater.



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The decree of 1954 also was pointed toward eliminating consistent failures in meeting plans for constructing new plants which had been occurring in spite of the earlier decree of 1952. Lags in construction persisted through 1955-56, and, as a result, the plan for commissioning capacity for production of precast concrete was fulfilled by only 59 percent over the 7 years 1950-56. Performance in construction during 1957 improved little. 84/

a. Construction.

Construction organizations failed to fulfill plans for commissioning enterprises for producing precast concrete during 1955-56. The pattern of achievements and failures is summarized in Table 2.\*

Although the goal set by the decree of 1954 on planned commissioning of capacity during 1955 was slightly exceeded, the revised plan for 1955 was fulfilled by only 72 percent. Delays and lags in construction were encountered throughout the year. For example, 81 of the plants to be commissioned in 1955 had not even been put under construction by 1 May 1955. Of the group of plants under construction which were to be commissioned in 1955, 32 were less than 25 percent complete. 85/ The plan for commissioning capacity in the first half of 1955, therefore, was fulfilled by only 85 percent. 86/

By the end of 1955, only 97 of the 193 plants planned for commissioning during the year had been constructed and put into operation. Failure to commission the other 96 plants resulted in a shortfall of 1.6 million cu m of capacity. 87/ Construction of the more easily erected casting yards, however, had been accelerated during 1955 in order to speed up the commissioning of productive facilities. A total of 367 yards was completed during the year, in contrast with the 200 yards projected for 1955-56 in the decree of 1954. 88/ Because commissioning of casting yards exceeded the plan, total capacity commissioned during 1955 was only 1.1 million cu m short of the plan (as indicated in Table 2).

During 1956, even more serious lags in construction and erection of enterprises for producing precast concrete occurred. The half-year plan for commissioning additional capacities was fulfilled by only 59 percent. 89/ The plan for the year as a whole was only 22 percent fulfilled after 9 months, 90/ so that by the end of the year little more than half of the final plan for commissionings had been achieved.

\* Table 2 follows on p. 26.

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Table 2

Commissioning of Capacity for Production  
 of Precast Reinforced Concrete Components  
 in the USSR a/  
 1955-56

<u>Years</u>	<u>Statement of Plan <u>b/</u></u>	<u>Plan</u> (Million Cubic Meters)	<u>Actual</u>	<u>Shortfall</u>	<u>Fulfillment</u> of Plan (Percent)
1955	Decree of 1954 <u>c/</u>	2.8	2.9		102
	Revision <u>d/</u>	4.0	2.9	1.1	72
1956	Decree of 1954	4.9	4.1	0.8	84
	Revision (1)	5.1 <u>e/</u>	4.1	1.0	80
	Revision (2) <u>f/</u>	7.6	4.1	3.5	54
1955-56	Decree of 1954	7.7	7.0	0.7	91
	Revision (1)	8.3 <u>g/</u>	7.0	1.3	84
	Revision (2)	9.1 <u>h/</u>	7.0	2.1	77
	Revision (3)	11.6 <u>i/</u>	7.0	4.6	60

a. The data as presented in this table have been rounded to the nearest hundred thousand cubic meters. The original data from the source, where available, have been presented in the unrounded form in the explanatory footnotes. All percentages have been computed from the unrounded data.

b. Numerous upward revisions in the construction plans for the given years were made after the decree of 1954. The known revisions for the years 1955 and 1956 are stated chronologically in the table.

c. The data from the decree of 1954 on plans for 1955, 1956, and 1955-56 are from source 91/.

d. Production capacity of 2,911,000 cu m was commissioned in 1955. The plan was fulfilled by only 72 percent, however, and the total shortfall amounted to 1.1 million cu m of capacity. 92/ The revised plan for 1955, therefore, was about 4.0 million cu m.

e. 93/

f. In 1956, production capacity of 4,094,000 cu m was commissioned, but 3.5 million cu m of capacity was not commissioned in spite of the plan. 94/ The latest plan available for 1956, therefore, called for commissionings totaling 7.6 million cu m of capacity.

g. This goal was revealed on 19 August 1955, the anniversary of the decree of 1954. 95/

h. Computed as the sum of the revised plan for 1955 and Revision (1) for 1956. In view of the 8.3 million cu m planned earlier for 1955-56

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Table 2

Commissioning of Capacity for Production  
of Precast Reinforced Concrete Components  
in the USSR  
1955-56  
(Continued)

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(see footnote f, above), probably little or no double counting is involved: that is, the 5.1 million cu m planned under Revision (1) for 1956 was formulated independently of the shortfall of 1.1 million cu m in 1955.

i. Computed as the sum of the revised plan for 1955 and Revision (2) for 1956. If double counting is entailed, it would be at most 1.1 million cu m (see footnote g, above); the sum of the capacity to be commissioned under the plans for 1955 and 1956 would still be at least 10.5 million cu m.

Although the plan for 1957 called for expediting completion of precast concrete enterprises, plans for capital investment and commissioning of additional capacity again were not met. According to preliminary data, the commissioning of additional capacity was not less than 2.5 million cu m. <sup>96/</sup> This amount is considerably less than the capacity commissioned in 1956 and probably somewhat less than that commissioned in 1955 (see Table 2).

b. Production.

The goals for production of precast concrete set forth in the 1954 decree were exceeded in each of the years 1954-57, inclusive, \* <sup>97/</sup> but the revised production goals were not.

Failure to fulfill the revised plan for commissioning capacity in 1955 did not handicap production significantly during 1955. The revised plans for production in 1956 and 1957, however, were considerably underfulfilled. The two latest revisions to the plans for production of precast concrete in 1956 and 1957 and their respective fulfillment were as follows:

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\* Much of the favorable performance, especially in the earlier years, is explained by two factors other than accelerated construction of additional capacity: (1) the definition of precast concrete was broadened after the decree of 1954 and (2) the planned assortments of components were ignored in favor of components of greater gross volume.

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Production in 1956

<u>Million Cubic Meters</u>		
<u>Plans for 1956</u>	<u>Production</u>	<u>Shortfall</u>
Stated in 1955: 9.0 <u>98/</u>	8.4 <u>99/</u>	0.6
Stated in 1956: 9.8 <u>100/</u>	8.4	1.4

Production in 1957

<u>Million Cubic Meters</u>		
<u>Plans for 1957</u>	<u>Production</u>	<u>Shortfall</u>
Stated in 1955: 13.8 <u>101/</u>	12.8*	1.0
Stated in 1957: 13.9 <u>103/</u>	12.8	1.1

Many, if not all, of the shortages in production in 1956 and 1957 could have been prevented had construction organizations commissioned the additional capacity planned during 1955-57. 104/ (See Table 2\*\* for the shortfalls in commissionings during 1955-56.)

2. Problems in Construction.

The persistent violations of schedules for construction of enterprises for producing precast concrete and the problems in overcoming them have been similar to those in construction of cement plants. Delays and lags in construction of enterprises for producing precast concrete, especially plants, are well documented through 1957. Moreover, indications are strong that such difficulties will continue through 1958. 105/

Financial allocations for construction have been insufficient to insure fulfillment of plans for construction and commissioning of additions to capacity. Part of this is attributable to the frequent disparity between construction plans and allocations as such and part to the fact that costs of constructing enterprises for producing precast concrete have considerably exceeded initial estimates. Thus initial estimate costs frequently are revised upward, and actual costs frequently exceed the revised estimates. 106/

\* Estimated from the announced increase of 52 percent in 1957 compared with 1956. 102/

\*\* P. 26, above.

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Late deliveries of designs and specifications to construction organizations, errors in the designs delivered, late confirmation of the lists of projects to be built in a given year, all these have hampered construction organizations in their work. 107/ On the other hand, construction organizations commission many enterprises even though construction-installation work is not completed. 108/

Incomplete deliveries of equipment to construction sites of enterprises for producing precast concrete have been one of the greatest handicaps to completion of construction as scheduled. In the first half of 1956, for example, only 2,709 of the 4,170 units of equipment scheduled for delivery were delivered. In the midst of such shortages, appreciable amounts of equipment have been delivered to particular construction sites only to remain unused for periods of a year or more because of lags in construction of the given projects. 109/

Construction and commissioning of enterprises for producing prestressed concrete apparently lagged tremendously behind rates planned during 1955-57.\* Although construction organizations have been at fault for some of this lag, the greater part has resulted from highly inadequate deliveries to construction organizations of the production equipment required for installation in plants and casting yards. 111/ There is some indication, however, that deliveries of prestressing equipment may have improved considerably during 1957. 112/

### 3. Prospects for 1960.

The draft Sixth Five Year Plan stipulated that production of precast concrete components would be increased to 28 million cu m in 1960, of which 7 million cu m would be in the form of prestressed concrete components. Although the production goals for 1960 for some other building materials have been revised downward, the goals for precast and prestressed concrete have not been changed. 113/

The capacity of the precast concrete industry, planned and achieved in selected years, was as follows:

\* Less than 20 percent of production planned for 1956 and about 25 percent of production planned for 1957 were fulfilled. 110/

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Effective Date (As of 1 January)	Capacity (Million Cubic Meters)	
	Plan	Actual <u>114/</u>
1955		4.3
1957	15.5 <u>115/</u>	12.5
1958	17 <u>116/</u>	N.A.

Failure to achieve the commissioning of capacity planned during 1955-57 left the industry with less capacity than planned at the beginning of 1957 and probably also at the beginning of 1958. Fulfillment of the plan to produce 16.9 million cu m of precast concrete in 1958, therefore, will require at the very least that commissionings planned, but not achieved, in 1957 be achieved early in 1958. 117/

In conjunction with the capacity of 12.5 million cu m of precast concrete achieved by 1 January 1957, it was stated that new capacity of 21 million cu m must be constructed and commissioned during the 4 years 1957-60. 118/ Little more than 2.5 million cu m was commissioned during 1957, 119/ however, leaving an average annual requirement of approximately 6 million cu m to be completed in 1958-60. Although the construction program may be overplanned to permit some shortfall without jeopardizing the goal for production in 1960, the amount of overplanning does not appear to be large enough to provide a buffer to shortfalls in construction (especially if the trend continues toward production in greater compliance with the planned assortment of components).\* Fulfillment of commissioning of the capacity planned in the remaining 3 years of the Sixth Five Year Plan, therefore, is a necessary condition for fulfillment of the goal for production in 1960.

In 1955 the cost of constructing enterprises for producing precast concrete was already considerably higher than anticipated. Two factors contributing to even higher cost per ton of additional capacity are (a) a trend, since the beginning of 1956, of emphasizing construction of precast concrete plants as opposed to casting yards 120/

\* With a capacity of 12.5 million cu m on 1 January 1957 and the commissioning of 21 million cu m in addition during 1957-60, capacity would total 33.5 million cu m by the end of 1960. (Increases in capacity during 1957-60 other than by commissioning are not expected to be significant.) In comparing the production goal of 28 million cu m with the capacity commissioned, however, production capacity effective for 1960 must be prorated from the capacity commissioned by the end of 1960.

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and (b) the need for accelerating construction (beyond rates previously planned) in the remaining 3 years to compensate for shortfalls in 1956-57. Attainment of the goal for 1960 for production of precast components, therefore, would seem to require accelerated completion of a large construction program in the remaining 3 years, 1958-60. Such a program could be carried out only at a total cost much greater than estimated in the draft Sixth Five Year Plan, entailing additional demands for construction resources already in short supply in making up for shortfalls in construction in other sectors.\*

C. Other Construction Materials.

Data on construction of enterprises in the USSR for production of other important building materials is meager compared with that available on cement and precast concrete components. Enough is available, however, to suggest the persistence of many failures in construction similar in kind, and at times in scale, to those in construction for the cement and precast concrete industries. In spite of a chronic shortage of lumber, for example, construction of sawmills has been dragged out for 3 to 7 years instead of being completed in the planned 1 to 3 years. 121/ Completion of productive facilities for the construction materials industry in general has lagged behind plans during 1955-57.\*\* 122/ Although the effect on production of other construction materials has been less immediate than in cement and precast concrete, continuation of such lags cannot fail to affect production.

The goals for production of cement and soft roofing in 1960 have been revised downward by 5 and 16 percent, respectively, from the goals stipulated in the draft Sixth Five Year Plan, whereas the goals for window glass, asbestos-cement shingles, and bricks have been raised by 6 to 9 percent. 123/ As detailed above, evidence is voluminous that persistent shortfalls in construction and commissioning of additional productive facilities in cement entailed a reduction in the goal for production of cement in 1960. Requirements for soft roofing obviously have not fallen below the level indicated by the production goal for 1960 of the draft Sixth Five Year Plan. 124/ Reduction of the original goal for 1960, therefore, suggests that

\* Practically no chance remains of attaining the goals for either construction or production in the prestressed concrete industry for 1960, except at a cost very much greater than justified by economies which would be effected by the use of prestressed concrete.

\*\* Specific lags have been indicated in construction of enterprises producing lumber, brick, tile, asbestos-cement shingles, building blocks, and rock products.

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serious shortfalls also have occurred in construction of productive facilities in soft roofing. The presumption is strengthened by the directives of the draft Sixth Five Year Plan, which had provided that 73 percent of the planned increase in production of soft roofing was to be obtained from additional facilities commissioned during 1956-60. In respect to revisions of the original goals for production of construction materials in 1960, the draft plan had provided that approximately 70 percent of the increases planned in the production of both cement and soft roofing were to be obtained from construction of additional facilities, whereas construction had been assigned a considerably smaller role in assuring the planned increases in production of asbestos-cement shingles and window glass.

Although the most glaring failures to achieve planned construction and commissioning of productive facilities have occurred in the cement and precast concrete industries, the situation in the construction materials industry in general is scarcely favorable. At the very least, the situation is such as to preclude significant shifts of the allotted construction resources within the industry itself without concomitant sacrifices of practically equal scale in those branches of the industry from which the shifts are made.

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### III. Ferrous Metallurgical Industry.

The ferrous metallurgical industry of the USSR is one of the high-priority branches of the economy, the rapid development of which has been a clear and consistent aim of the Party and the government. Approximately 8 percent of the total volume of state capital investment was directed into the ferrous metallurgical industry during the period of the Fourth Five Year Plan (1946-50), about 6 percent during the period of the Fifth Five Year Plan (1951-55), and an estimated 7 percent under the draft Sixth Five Year Plan (1956-60).

Within the industrial sector, according to the draft Sixth Five Year Plan, an estimated 12 percent of state capital investment in industry was planned to be allocated to ferrous metallurgy. Moreover, of the more than 400 billion rubles which were to be directed into investment in given heavy industries -- that is, in electric power stations and in the ferrous and nonferrous metallurgical, chemical, petroleum, coal, timber, and construction materials industries -- an estimated 18 percent was to be allocated to ferrous metallurgy.\*

The role of construction in the ferrous metallurgical industry during 1956-60 is a considerable one. As outlined by the draft Sixth Five Year Plan, 65 percent, or 12.8 million tons, of the planned increase in production of pig iron; 53 percent, or 12.2 million tons, of the planned increase in production of steel; and 60 percent, or 10.4 million tons, of the planned increase in production of rolled metals were to be obtained from additional productive facilities commissioned during the period. 126/ To these ends, new production capacity was to be constructed and commissioned, amounting to 16.8 million tons of new capacity for pig iron, 15.8 million tons of new capacity for steel, and 16.3 million tons of new capacity for rolled metals. 127/ Thus the planned increases in capacity are greater than the contributions to production which are required from the newly commissioned facilities in order to meet the production goals of the Sixth Five Year Plan.\*\* The apparent excess capacity could thereby provide a buffer between underfulfillment of the construction programs and fulfillment of the production goals for given products.

\* The above estimates were computed from data given in the tabulation on p. 34, below; and source 125/.

\*\* The excess capacity so derived, however, must be discounted to some extent to reflect the fact that the goals for commissioning of capacity are for the end of 1960; and thus would not be effective capacity on 1 January 1960.

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The real extent of any built-in buffers is questionable. At the Twentieth Party Congress, A.G. Sheremetyev, then Minister of Ferrous Metallurgy, warned that the projects planned for commissioning during the Sixth Five Year Plan should be completed on schedule if the goals for production in ferrous metallurgy were to be met. He indicated more specifically that even if the huge construction program planned for facilities to mine and process iron ore were fulfilled, there would be no reserve capacity in 1960. The fact is that throughout the years since the end of World War II the weakest spot in ferrous metallurgy has been and remains capital construction.\* 128/ The volumes of state capital investment and construction-installation work performed for the ferrous metallurgical industry\*\* during the periods of the Fourth and Fifth Five Year Plans and the draft Sixth Five Year Plan (in prices of 1 July 1955) are estimated as follows\*\*\*:

	Fourth Five Year Plan (1946-50)	Fifth Five Year Plan (1951-55)	Draft Sixth Five Year Plan (1956-60)
Capital investment (billion rubles)	24	36	70
Construction-installation work (billion rubles)	18	26	50
Share of construction-installation in capital investment (percent)	76	73	71
Fulfillment of capital investment plan (percent)	Underfulfilled	82	
Fulfillment of construction-installation plan (percent)	Underfulfilled	80****	

\* Capital construction, the more descriptive term, is the same as capital investment.

\*\* See the footnote on p. 11, above.

\*\*\* Capital investment during the period of the Fourth and Fifth Five Year Plans was derived from the volume of state investment during 1956 129/ and an index of investment, presumably in prices of 1 July 1955, given in source 130/. Percentage shares of construction-installation during the Fourth and Fifth Five Year Plans were stated in source 131/. The volume of capital investment in ferrous metallurgy under the Sixth Five Year Plan was to be increased by almost 100 percent. 132/ The estimated share of construction-installation is an approximation based on the reported shares during the two previous plans. The data on fulfillment of plans are from source 133/.

\*\*\*\* Under the Fifth Five Year Plan the volume of construction-installation work performed for the Ministry of Ferrous Metallurgy by the Ministry for Construction of Metallurgical and Chemical Industry Enterprises was only 77 percent of the plan. 134/

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Failure to fulfill plans for capital investment in ferrous metallurgy continued through 1956 and 1957. Although no specific statements have been released, the plan for investment in ferrous metallurgy probably was considerably underfulfilled in 1956.\* The national economic plan for 1957, generally geared toward moderation and retrenchment of rates of growth, called for the volume of state capital investment to be increased by 9 percent in the economy as a whole, but investment in the ferrous metallurgical industry was to be increased by 20 percent. Later in 1957 the investment plan for the ferrous metallurgical industry was revised to an increase of 30 percent above that for 1956. Neither of these goals was achieved. In fact, the actual increase certainly was less than 6 percent.\*\*

The initial national economic plan for 1958 provided for capital investment in the ferrous metallurgical industry to be increased 37.5 percent, in contrast with the 7.5 percent increase planned for the economy as a whole. 137/ Other plans for construction in ferrous metallurgy during 1958-59 have been stated specifically, giving some indication of the magnitude of development planned for later years. The effect of previous persistent failures to achieve planned capital investment and of other problems in construction for ferrous metallurgy are examined in physical terms for the separate branches of ferrous metallurgy in the following sections.

A. Iron Ore.\*\*\*

1. Construction Under the Fifth Five Year Plan (1951-55).

Development of the iron ore industry of the USSR during 1951-55 was provided almost solely from building up capacity at

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\* The inadequacies of construction in ferrous metallurgy during 1956 were criticized severely in the report on the national economic plan for 1957. Moreover, the volume of capital investment in ferrous metallurgy showed little, if any, increase above the volume performed during 1955. 135/

\*\* A total of 8.3 billion rubles was invested in 1956, and an investment of 8.8 billion rubles in 1957 was anticipated in the statement of the plan for 1958. These data, although in prices of 1 July 1955, are not strictly comparable. The figure for 1957 is in the new regional unit valuations, so that the comparative increase is somewhat overstated. It might also be noted that the report on plan fulfillment during 1957 indicated that capital investment in metallurgy as a whole was increased by 9 percent. 136/

\*\*\* In addition to construction of nonproductive facilities such as housing, the role of construction in developing facilities for mining and processing iron ore concerns chiefly the building of productive facilities for (1) the mining of crude [footnote continued on p. 36]

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established ore-mining enterprises. Four new mining enterprises were constructed during the period, as follows:

- a. The iron ore mine imeni Gubkin of the Kursk Magnetic Anomaly (KMA), commissioned at the end of 1952, which has a capacity of 0.5 million tons of raw iron ore per year and has magnetic-concentrating and agglomerating plants;
- b. The Dashkesan iron ore mine in Azerbaydzhan SSR, commissioned at the end of 1954, which has a capacity of 1.2 million tons of raw iron ore per year and has a magnetic-concentrating plant;
- c. The Olenegorsk iron ore mine in Murmansk Oblast, put into operation in 1955, which has a capacity of 2.7 million tons of raw iron ore per year and has a magnetic-gravitational concentrating plant; and
- d. The Southern Ore-Concentrating Combine in the Krivoy Rog Basin, commissioned in 1955, which has a capacity of 9 million tons of ferrous quartzites per year and has magnetic-concentrating and agglomerating plants. 138/

At these four new enterprises a total capacity for 13.4 million tons of raw iron ore was commissioned under the Fifth Five Year Plan.

The total picture, however, is much less favorable. Under both the Fourth and the Fifth Five Year Plans the goals for commissioning ore-mining and agglomerating facilities were not met. The Fourth Five Year Plan for commissioning of capacity in the extraction of iron ore was fulfilled by only 64.2 percent. Under the Fifth Five Year Plan, only 60.4 percent of the plan for commissionings was achieved. 139/ Capacity for mining 41.2 million tons of raw iron ore was commissioned during 1951-55, 140/ although the plan had called for 67 million to 68 million tons; therefore, the shortfall in commissionings amounted to about 26 million tons. 141/

2. Draft Sixth Five Year Plan (1956-60).

In contrast with the period of the Fifth Five Year Plan, the further development of the iron ore industry under the draft

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iron ore, (2) the separation or concentration of crude ore into an ore concentrate of higher ferrous content, and (3) the agglomeration of the finely ground concentrate into larger sizes more suitable for use in blast furnaces.

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Sixth Five Year Plan was to be attained chiefly from new deposits put into operation during 1956-60. The timely construction and completion of ore-concentrating facilities is also an important factor in the Sixth Five Year Plan because the new deposits generally contain poor iron ores and ferrous quartzites. Soviet authorities anticipated that in 1960 it would be necessary to mine 167 million tons of raw iron ore in order to obtain 119.6 million tons of usable ore, a ratio of 1.4 to 1 compared with the ratio of 1.2 to 1 in 1955. 142/

Capital investment to be made in the iron ore industry during 1956-60 was to provide for construction and commissioning of new productive capacity amounting to 84 million tons of raw iron ore per year, an increase of about 104 percent above the capacity commissioned during 1951-55. (Commissioning of ore-concentrating capacity apparently also is to be increased by more than 100 percent.) It has been stated that even if this goal is met, the iron ore economy would have no reserve capacity in 1960.\* The importance of meeting this goal can be seen also in that an estimated 60 percent of the planned increase in production of usable ore in 1960 above that in 1955 is to be obtained from new deposits and new sections of established deposits which are put into operation during 1956-60.\*\*

\* In his speech to the Twentieth Party Congress, Sheremetyev stated that new mining capacity of 91 million tons of iron ore would be commissioned during 1956-60 (and that even with such new capacity the iron ore economy would not have reserves in 1960). The directives on the Sixth Five Year Plan, however, set a goal of only 84 million tons. In Zhelezorudnaya baza chernoy metallurgii SSSR (The Iron Ore Base of Ferrous Metallurgy in the USSR), published in mid-1957, the goal of 84 million tons is stated in conjunction with the other goals for construction in ferrous metallurgy, goals identical with those given in the draft Sixth Five Year Plan. Nevertheless, it is also stated in Zhelezorudnaya baza chernoy metallurgii SSSR that the plan worked out by the Ministry of Ferrous Metallurgy, USSR, for the Sixth Five Year Plan called for commissioning of capacity to mine 119.4 million tons of raw iron ore, an increase of 190 percent above the capacity commissioned during 1951-55. 143/ A clear explanation for the various goals is not available. It is possible, however, that the higher goals represent investment programs which were sought by the Ministry of Ferrous Metallurgy in order to support the production goals in ferrous metallurgy, investment programs considerably higher than that finally approved for the Sixth Five Year Plan. (It is also possible, as explained in the footnote on p. 38, below, that the 91 million tons is simply an error.)

\*\* This was derived from data on the relative shares of old and new deposits in the output of usable ore in 1955 and planned for 1960. 144/ The data on usable ore is employed in the absence of relevant data on raw ore.

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Capital investments in the iron ore industry were planned at 20 billion rubles for 1956-60, more than 180 percent greater than the volume performed during 1951-55. Investment in the iron ore industry is estimated to have comprised 20 percent of capital investment in the ferrous metallurgical industry under the Fifth Five Year Plan and is to be nearly 30 percent under the Sixth Five Year Plan. This increase is a corollary of planning a greater increase in investment in iron ore mining than in ferrous metallurgy as a whole, but it also reflects the greater costs per ton of additional iron ore capacity under the Sixth Five Year Plan compared with that experienced under the Fifth Five Year Plan. The investment costs per ton of additional capacity for raw iron ore under the Sixth Five Year Plan will be 30 to 40 percent higher than during 1951-55.\* The higher costs, in turn, are connected with the need for greater emphasis on new construction in ore mining than under the Fifth Five Year Plan.

\* Sheremetyev reported to the Twentieth Party Congress that capital investments in ore mining were 7 billion rubles in 1951-55 and were planned to be 20 billion rubles in 1956-60. In Zhelezorudnaya baza chernoy metallurgii SSSR (The Iron Ore Base of Ferrous Metallurgy in the USSR) it was reported that investments in ore mining were 8.3 billion rubles in 1951-55 and were planned to be 23.4 billion in 1956-60 (in prices of 1 July 1950). 145/ So far as is known, investment data given at the Twentieth Party Congress were reported in prices of 1 July 1955. Thus the data on investments in iron ore mining during 1951-55 indicate that investments (in iron ore mining) may be converted from prices of 1 July 1950 to 1 July 1955 with the use of a reduction coefficient of 0.84. In respect to the Sixth Five Year Plan, Sheremetyev had spoken of planned commissionings of raw iron ore capacity totaling 91 million tons, whereas Zhelezorudnaya baza chernoy metallurgii SSSR referred to a goal of 84 million tons. Several factors impart a strong suspicion that the statement of 91 million tons may be in error. Conversion of the investment goal of 23.4 billion rubles (in prices of 1 July 1950) to prices of 1 July 1955 yields an estimated planned investment of about 20 billion rubles for the Sixth Five Year Plan -- identical with that stated by Sheremetyev. Moreover, the investment data from both sources yield practically identical increases planned for 1956-60 compared with 1951-55 (that is, increases of 182 and 186 percent). Because Zhelezorudnaya baza chernoy metallurgii SSSR is the more reliable source and does not state a planned goal of 91 million tons, it may well be that the goal of 91 million tons, as stated by Sheremetyev, is simply an error. With reference to the increasing costs per ton of additional capacity for raw iron ore, the investment data in Zhelezorudnaya baza chernoy metallurgii SSSR indicates an increase of 40 percent under the Sixth Five Year Plan, whereas the data /footnote continued on p. 39/

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Thus the draft plan for 1956-60 provided for construction and commissioning of new, large-scale iron ore deposits as follows:

- a. Novo-Krivoy Rog, Skelevatsk (northern part) and other deposits of ferrous quartzites in the Krivoy Rog Basin -- to supply concentrates of iron ore to metallurgical plants of the southern USSR;
- b. Sokolovsk-Sarbay in Kustanay Oblast -- for the Chelyabinsk plant and the Magnitogorsk Metallurgical Combine;
- c. Karadzhalsk (Atasu) in Karaganda Oblast -- for the Karaganda plant;
- d. Abakan and Teysk in Siberia -- for the Kuznetsk Metallurgical Combine;
- e. Lebedinsk and Yuzhno-Korobkovsk (in the KMA) in Belgorod Oblast -- for the Novo-Lipetsk plant;
- f. Akkermanovsk -- for the Orsk-Khalilovo Combine;
- g. Yensk-Kovdorsk in Murmansk Oblast -- for the Cherepovets plant;
- h. Kachkanar in Sverdlovsk Oblast -- for the Novo-Tagil plant;
- i. Korshunovsk in Siberia -- for the West Siberian plant; and
- j. El'tigen-Ortel'sk on the Kerch' peninsula -- for the Azovstal' plant.

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reported by Sheremetyev (if the statement of planned commissionings amounting to 91 million tons is used) indicates an increase of 30 percent.

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According to the draft Sixth Five Year Plan, production of usable ore in 1960 was to be approximately 48 million tons greater than in 1955, and about 29 million tons, or 60 percent, of this increase was to be obtained from new deposits and new sections of established deposits to be commissioned during 1956-60. Nearly 25 million tons of the 29 million tons were to be produced in 1960 at new ore-mining enterprises, as follows:

	<u>Million Metric Tons</u>
Krivoy Rog	9.6
Sokolovsk-Sarbay Ore-Concentrating Combine	5.6
Atasu	2.4
Kuznetsk Metallurgical Combine	2.4
Combines of the KMA	2.1
Orsk-Khalilovo Combine	1.6
Kovdorsk	1.0

Of the above-mentioned enterprises, particular priority was to be given to construction and commissioning of the Sokolovsk-Sarbay, Kachkanar, Abakan, and Teysk depositions in the east; the Yensk-Kovdorsk deposit in the northwest; the Lebedinsk deposit in the Moscow area; and the Novo-Krivoy Rog deposits in the Krivoy Rog Basin. 146/

3. Plans, Achievements, and Failures, 1956-58.

a. 1956.

The serious lags in construction of enterprises for mining iron ore experienced under the Fourth and the Fifth Five Year Plans persisted through 1956. The plan for commissioning new capacity for the extraction of iron ore was not fulfilled in the first half of 1956, and by the end of that year the plan had been fulfilled by only 50 to 52 percent. Of 17 new mines and quarries which were to have been commissioned, only 2 were actually put into operation. In the very important Krivoy Rog Basin, 6 new iron ore mines were to have been completed in 1956, but only 1 was realized. As a result, the plan for commissionings during that year was fulfilled by 46.5 percent. 147/

Construction of ore-concentrating facilities continued to lag in 1956. The Southern Ore-Concentrating Combine, with an annual capacity of 5.2 million tons of fluxed agglomerates



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(presently the largest in the country), was to have been completed in its entirety in the fourth quarter of 1955. Its final section, however, was not put into operation until mid-1957. 148/ Construction plans for the Sokolovsk-Sarbay Ore-Concentrating Combine, the largest mining construction site in the USSR, received priority in 1956 because the Combine was to yield more than a million tons of raw iron ore in 1957. Nevertheless, the year's building program for the Combine had been less than half completed by the end of November 1956. The Sokolov Ore Construction Trust completed only 123 million rubles' worth of construction-installation work in 1956, or 61 percent of its plan. 149/ In 1956, construction of the Kachkanar Ore-Concentrating Combine (next largest to the Sokolovsk-Sarbay) was in the first stages of construction only, and yet the work was lagging. 150/ Other reports indicate that construction lagged also at lesser ore-concentrating facilities. 151/

Similarly, construction organizations performed very poorly in the construction and completion of sintering lines.\* The draft Sixth Five Year Plan had provided that 58 new sintering lines would be constructed and put into operation, whereas 39 lines were completed during 1951-55. In 1956, even though the plan called for commissioning 10 lines (presumably in the Ukrainian SSR), only 1 was put into operation. 152/

b. 1957.

In an attempt to make up for some of the lag in completing facilities to mine and process iron ore, the plan for 1957 called for commissioning new capacity of more than 20 million tons of iron ore. The first and second units of the Abakan mine with a total capacity of 1.6 million tons of iron ore per year were to be completed, as were mines in the Krivoy Rog Basin with a total capacity of 1.65 million tons. Mines at Atasu, Lebyazhinsk, Goroblagodatsk, and other locations also were to be completed, along with the crushing and sorting mill at the Sokolov Mine and the Southern Ore-Concentrating Combine. A considerable volume of work was to be performed at the Sokolovsk-Sarbay Ore-Concentrating Combine, among others. Moreover, work was to be started on the Novo-Krivoy Rog and the Central Ore-Concentrating Combines and on construction projects at the Belgorod deposits of the Kursk Magnetic Anomaly (KMA). 153/

By the end of the first 5 months, it was clear that construction at a number of sites (including mining projects) was not progressing at rates which would insure the goals planned for 1957. Thus it was stipulated that capital investment in ferrous

\* Sintering is one of the methods by which ore concentrates are agglomerated.

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metallurgy would be increased 800 million rubles more than was planned earlier, of which about 190 million rubles, or 24 percent, were to be allocated to the iron ore industry. Of the 190 million rubles, 20 million were allocated to the Sokolovsk-Sarbay Ore-Concentrating Combine, 30 million to the Kachkanar site, 10 million to the Teysk site, 7 million to the Abakan site, and 5 million to the Lebedinsk ore mines. 154/ Because of the generally more extensive lags in construction of iron ore facilities, compared with lags in other branches of ferrous metallurgy, the direction of only 24 percent of the increased allocations into iron ore facilities seems at odds with the clear need to accelerate more than proportionally the buildup of the iron ore base. (As indicated above, investment in ore mining enterprises was estimated to be 20 percent of investment in ferrous metallurgy during 1951-55 and was planned to be nearly 30 percent under the Sixth Five Year Plan.)

By the end of 1957, 8 iron ore mines and quarries and 7 sintering plants had been commissioned in the Ukrainian SSR. The Southern Ore-Concentrating Combine was completed, and the first ore had been produced from the Sokolov quarry of the Sokolovsk-Sarbay Ore-Concentrating Combine. 155/ In spite of these achievements, however, there were significant shortfalls. Construction and commissionings lagged throughout the year at such ore-mining sites as Atasu, Abakan, Teysk, Lebyazhinsk, and ore enterprises in the KMA, in Gornaya Shoriya, and in the Tagilo-Kushva area. Although extractive capacity of 1 million tons of ore was commissioned at the Sokolov quarry in 1957, only 16.2 million cu m of overburden had been stripped by the beginning of 1958 instead of the 26 million cu m planned, and stripping operations at the Sarbay quarry were barely started. 156/

The plan for commissioning new capacity for the extraction of iron ore was not fulfilled in the first half of 1957 and again for the year as a whole, notwithstanding the revised plan for investment. In the Krivoy Rog Basin, for example, the plan for commissionings was fulfilled by 69.5 percent. 157/ Capacity for mining approximately 14 million tons of iron ore per year was commissioned in 1957 in the USSR as a whole, or an estimated 70 percent of the plan.\*

\* At the end of 1957, builders of mining enterprises were assigned the task of commissioning new capacity for mining 10,140,000 tons of raw iron ore in 1958. Because a number of projects were not commissioned according to plan in 1957, the plan for 1958 was raised to 16,120,000 tons. 158/ Estimates are that commissionings in 1957 fell 6 million tons short of plan.

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c. 1958.

The initial plan for 1958 provided that capital investment in the iron ore industry of the USSR was to be increased 73.4 percent above that of 1957, a figure considerably greater than the planned increase of 37.5 percent in the ferrous metallurgical industry as a whole. For the RSFSR, the plan called for a 64-percent increase in capital investment in the iron ore industry compared with a 36-percent increase planned for the ferrous metallurgical industry. Development of facilities to produce iron ore was to be accelerated in the KMA by capital investment nearly 100 percent greater than in 1957. 159/

The special characteristic of the plan for 1958 was said to have been the increased attention to the iron ore industry and the buildup of the construction carryover (zadel\*) which would permit a sharp increase in capacity in the entire metallurgical cycle during 1959. Thus the plans for 1958-59 stipulated that new capacity for about 10 million tons of raw iron ore was to be commissioned during 1958 and about 24.7 million tons in 1959, or almost 35 million tons in the 2 years, 1958-59. Of the new capacity to be commissioned during 1958, more than 5 million tons were to be in the Ukrainian SSR, more than 3 million tons in the RSFSR, and approximately 2 million tons in Kazakh SSR. More than 9 million tons of the planned 10 million tons in 1958 were to be commissioned at the following locations 160/:

	<u>Million Metric Tons</u>
Krivoy Rog Basin	2.1**
Kamyshburunsk Combine (in the Crimea)	2.5
Ore mines of the KMA	1.1
Sokolovsk-Sarbay Ore-Concentrating Combine	1.5
Atasu deposits	0.4
Ore-mining enterprises of the Kuznetsk Metallurgical Combine	0.6
Iron ore mines of the Urals	1.0

\* The Russian term zadel has two meanings: (1) the accumulation of materials and equipment as the operative base of a construction organization and (2) the volume of construction put in place at projects not yet put into operation (the opposite, therefore, of the volume of construction remaining to be put in place in order to commission the project). In this report, the term will be used only in the latter meaning and is most simply expressed by construction carryover.

\*\* Also reported as 1.2 million tons. 161/ The 2.1 million tons probably is the correct figure in view of the plan for the Ukrainian SSR as a whole.

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Progress in construction at some of the above projects during the first quarter of 1958 is shown in Table 3.\* The monthly plans for construction-installation work during both February and March were considerably underfulfilled at one-half of the projects listed and were fulfilled or considerably exceeded at the other half: In terms of the degree to which the annual plans had been fulfilled in the first quarter, construction was proceeding satisfactorily at one-half of the projects, including the three largest listed.

Construction was accelerated at several projects in the second quarter, and the pattern of progress in construction through the first 7 months of 1958 is more favorable. The Krivoy Rog mine, "Kamenistaya," is due to be commissioned several months ahead of time. The first section of the Chernomorsk iron ore mine of the Kamysheburunsk Combine, with a capacity of 1.5 million tons, was commissioned in March. The second section (with a capacity of 1 million tons), however, is proceeding much less satisfactorily. At the Sokolovsk-Sarbay Ore-Concentrating Combine, construction of the project which is to be commissioned in 1958 is progressing satisfactorily, but construction at the combine as a whole is lagging seriously. As of 1 August 1958, construction was still considerably behind schedule at one-half of the projects listed and ahead of schedule at some of the others. 162/

The problems in construction of enterprises in the iron ore industry during 1958 and following years are even more burdensome than indicated in the above discussion. The initial plan for 1958 called for commissioning 10 million tons of capacity for the extraction of raw iron ore, but the plan was raised later to 16 million tons because of failure to meet planned commissionings during 1957. This upward revision was explained later in terms of greater opportunities which were open to construction organizations because of unfinished construction (construction carryover). 163/ The record in construction of iron ore enterprises through 1957 is, however, a strong denial of the reality of such opportunities.

4. Prospects Through 1960.

Builders of iron ore enterprises apparently are still charged with fulfilling the directives of the draft Sixth Five Year Plan, with little or no significant changes in the construction program as far as the terminal goals for 1960 are concerned. Construction and commissioning of iron ore mining, concentrating, and agglomerating facilities, however, has been and continues to lag behind

\* Table 3 follows on p. 45.

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Table 3  
Fulfillment of Selected Planned Construction-Installation Work  
on Iron Ore Construction Projects to Be Commissioned in the USSR  
in 1958 a/

Mining Enterprises	Total Estimate Cost of Project b/ (Million Rubles)	Estimate Cost of Work for 1958 (Million Rubles)	Fulfillment of Planned Construction-Installation Work (Percent)				Approximate Planned Date of Commissioning
			For Feb- ruary 1958	For 1958, from 1 January to 1 March	For March 1958	For 1958, from 1 January to 1 April	
Sokolovsk-Sarbay Ore-Concentrating Combine	116.3	110.1	110.6	19.0	100.0	32.0	4 December
Yuzhno-Korobkovsk iron ore mine of the Kursk Magnetic Anomaly	84.7	39.7	72.5	10.8	103.0	20.5	22 November
Krivoy Rog mine "Kamenistaya"	24.1	16.0	N.A.	16.1	111.5	19.8	31 December
Krivoy Rog mine "Yuzhnaya"	23.3	11.5	58.0	5.4	82.3	10.4	31 December
Atasa iron ore mine	26.3	10.7	93.0	N.A.	80.0	5.0	1 October
Chernomorsk iron ore mine, second line (of Kamyshburunsk Combine)	22.3	8.8	N.A.	N.A.	35.0	2.5	16 December
Abakan iron ore mine (of the Kuznetek Metallurgical Combine)	31.2	6.0	132.8	23.8	140.0	33.5	31 December
Tashtagol'sk iron ore mine (of the Kuznetek Metallurgical Combine)	5.8	4.9	48.8	4.0	78.0	13.2	31 December
Sheregeshsk iron ore mine (of the Kuznetek Metallurgical Combine)	8.3	2.9	101.5	12.5	54.0	14.7	31 December
Shalysk iron ore mine (of the Kuznetek Metallurgical Combine)	1.5	0.6	262.5	N.A.	200.0	11.8	31 December
"Third Magnitka" quarry (Sverdlovsk sovnarkhoz)	4.5	4.5	88.0	N.A.	100.5	40.0	1 October

a. All data are from source 164/.

b. The difference between the total estimate cost of the project and the estimate cost of work for 1958 is the volume of work put in place up to 1 January 1958. The total estimate cost in this table refers only to the total cost of the given project which is to be commissioned in 1958 rather than to the total cost of the entire complex, such as the entire Sokolovsk-Sarbay Combine.

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the tempo required to fulfill the goals of the Sixth Five Year Plan.\* 165/

In the Krivoy Rog Basin, construction of the Southern Ore-Concentrating Combine was completed in 1957, and starts were made on the Novo-Krivoy Rog and Central Ore-Concentrating Combines. Construction of the Second Southern Combine is to be started in 1958, and three more combines are to be commissioned by 1965. The entire group of ore-concentrating combines is to have an approximate capacity of 72 million tons of raw iron ore per year, or more than 30 million tons of dry concentrates with a ferrous content up to 62 percent. By the end of the Sixth Five Year Plan, commissionings of the first sections at the Novo-Krivoy Rog, Second Southern, and Central Ore-Concentrating Combines together are to provide a total annual capacity of 12 million tons of concentrates. The first section of the Novo-Krivoy Rog Ore-Concentrating Combine must be put into operation in 1959, yet construction of the principal industrial projects at the Combine had barely been started as of the beginning of 1958. First sections of both the Central and Second Southern Ore-Concentrating Combines are to be put into operation in 1960. (The estimate cost of both projects, when completed, is more than 1 billion rubles each.) Construction work at the Central Ore-Concentrating Combine is lagging seriously behind the tempo required for commissioning in 1960, and 1958 will be the first year of work at the Second Southern Ore-Concentrating Combine. The past pattern of serious lags in construction of concentrating facilities in the Krivoy Rog Basin, therefore, had not been corrected as of early 1958, and urgent measures are required to accelerate the tempo of construction. Such measures require greatly increased allocations of construction resources, yet the construction combine of the Basin had less than half of the resources required for the construction program of 1958. 166/

Even if the planned rate of development in the Krivoy Rog area is achieved, the rapidly increasing requirements of steel mills in southern USSR will not be met through 1960; therefore, the new iron ore base in the KMA is to be developed to supplement the Krivoy Rog base. Although its development is clearly a long-term orientation of 8 to 10 years, the KMA already is of considerable importance. Construction appears to be proceeding satisfactorily at the new Yuzhno-Korobkovsk iron ore mine (see Table 3\*\*) which is to be put into operation in 1958, but conditions are less than satisfactory at other

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\* The bases for determining lags in construction and commissioning of enterprises of the iron ore industry at this point in the report are the construction and production goals through 1960 rather than those for individual years such as 1957 or 1958.

\*\* P. 45, above.

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mining projects in the KMA. Construction is behind schedule at the Lebedinsk open-pit iron ore mine, which is to be put into operation in 1959. The first section of the open-pit mining enterprise at the Mikhailovka deposit, with an annual capacity of about 2.5 million tons of iron ore, is to be put into operation in 1960. The project is a large one, and serious lags in much of the preparatory construction (including construction of ancillary facilities) are being encountered as well as a number of other problems involving subcontractors. Development of the KMA must have received a considerable setback after a decision was made, apparently in formulating the revised plan for 1957, to postpone completion of the open-pit mines in the Kursk and Belgorod areas until after the Sixth Five Year Plan. The plan for 1958, however, calls for accelerated completions. Clear warnings have been issued by qualified engineers in the KMA Iron Ore Construction Trust and organizations of the KMA Iron Ore Combine that the construction resources (materials, equipment, and manpower) commanded by their organizations are inadequate to fulfill the planned programs of construction in the KMA during 1958-60. Urgent measures are required to accelerate construction in order to overcome the lags in development of the KMA. Acceleration of construction requires, in turn, building up the productive bases of the construction organizations themselves, and this effort requires time and additional allocations of physical as well as financial resources. 167/

In the Urals the considerable lags in construction of ore mining and concentrating facilities of the Tagilo-Kushva and Bakal'sk areas presently are holding back the smelting of pig iron at the Nizhniy Tagil and other metallurgical plants. Acceleration of lagging mine construction is required also at the Goroblagodatsk, Vysokogorsk, and Lebyazhinsk iron ore mines. The draft Sixth Five Year Plan stipulated that the Kachkanarsk Ore-Concentrating Combine, which is to become the principal source of iron ore for ferrous metallurgy of the northern Urals, was to be put into operation. Although a minimum of 4 to 5 years is required to build such a combine, the preparatory work on it has barely started. Very small financial allocations have been provided so far, and even these have not been used fully because the construction organization is still too small. 168/

Farther east, construction is lagging seriously on the Atasu iron ore mine and the Sokolovsk-Sarbay Ore-Concentrating Combine as a whole. Construction of ore mining enterprises in Gornaya Shoriya and Khakassiya, which are to provide ore for the Kuznetsk Metallurgical Combine, is behind schedule. The financing of the Kuznetsk Iron Ore Construction Trust was in complete disorder recently, and many operations on projects to be commissioned in 1958 were completely, though temporarily, curtailed. Moreover, the criticism has

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been made that the construction organizations of the mining administration of the Kuznetsk Metallurgical Combine, which have a greater volume of construction work to perform than the Kuznetsk Iron Ore Construction Trust, are even less responsive to the urgent need to accelerate construction. Finally, confusion apparently continues as to when, where, and what facilities are to be constructed for mining and concentrating iron ore at Korshunovo, which are to support the West Siberian metallurgical plant. 169/

An analysis of the causes and contributing factors underlying the persistent shortfalls in construction and completion of iron ore enterprises is essential to assess the prospects for accelerating development of the iron ore base. The principal reason for shortfalls in construction is the inadequate capacity of construction organizations: that is, the construction materials, equipment, and manpower at the command of the organizations building iron ore facilities have been insufficient to insure fulfillment of construction schedules. Thus financial allocations for given projects often are not fully utilized. Frequently, situations occur in which construction workers and equipment are in short supply or are idle because of serious shortages of building materials.

Errors in planning complicate the problems. Decisions on important projects as to when and where to build, the designs for the project, and the volume of work to be performed are delayed so long as to jeopardize the long-term construction schedule of the project. Allocations of investment, even for the most important projects to be commissioned within the year, are set too low to permit fulfillment of schedules or are revised upward even though the organizations concerned do not have the capacity to meet the increased volumes of work. Both Gosplan and the Ministry of Ferrous Metallurgy have been accused of erroneously limiting capital investment for a number of years in the development of large iron ore enterprises in given areas and of dispersing investment resources elsewhere on construction of small- and medium-size iron ore mines and concentrating facilities. In the Krivoy Rog area, All-Union and republic Ministries of Ferrous Metallurgy failed to provide for the timely construction of ore-concentrating plants in anticipation of depletion of the rich ores. Plans for such construction were greatly accelerated after the fact, but the construction organizations in the area are neither large enough nor numerous enough to cope with the accelerated program.

Ineffective organization, management, and execution of the construction effort have been a considerable handicap in many situations. Construction of many of the ancillary facilities at iron ore mining enterprises is performed by numerous small construction organizations under the jurisdiction of ministries or administrations other

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than the client or construction ministry. The control exercised by the general contractor over the entire construction operation also seems quite inadequate. Decisions on many subprojects are made by other ministries and administrations, or their confirmations of decisions are delayed, so that the whole operation is coordinated ineffectively in respect to meeting the construction schedule of the major project. Moreover, complaints are made that because the large construction organizations are not sufficiently specialized in the construction of iron ore enterprises, they must distribute too much of their inadequate fund of resources to construction of other enterprises and nonproductive facilities. A number of proposals have been made to concentrate the management of construction of iron ore enterprises in large specialized construction organizations responsible for building only iron ore enterprises. In the presence of generally inadequate capacities of construction organizations, however, such proposals frequently are only paper solutions -- the specialized organizations are formed, but with highly inadequate resources in equipment, manpower, materials, and subordinate organizations as, for example, at Krivoy Rog, Kuznetsk, and Sokolovsk-Sarbay.

Finally, tardy deliveries of designs and specifications and the inadequate capacity of designing organizations have been handicaps to meeting construction schedules for ore-mining enterprises. 170/

The above factors are the principal reasons for the poor performance in building iron ore enterprises in the years since World War II. The record to date and plans through 1960 are summarized in Table 4.\* There are numerous indications that the lags in development of facilities for mining and processing iron ore have been holding back the swift building up of capacity and production of pig iron, steel, and rolled metals. 171/ The draft Sixth Five Year Plan had provided that new capacity in the extraction of raw iron ore totaling 84 million tons was to be constructed and put into operation during the period. Even this great construction program would not provide the iron ore economy with reserve capacity in 1960. The impact of the failure to construct adequate facilities for mining and processing iron ore under the Fifth Five Year Plan will still be felt by the end of 1960. It is estimated that about 60 percent of the planned increase in production of usable ore for 1960 above that of 1955 was to be obtained from new capacity to be put into operation under the Sixth Five Year Plan. The considerable shortfalls in putting capacity into operation during 1956 and 1957 have already seriously compromised the production returns previously anticipated for 1958-60.

\* Table 4 follows on p. 50.

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Table 4

Commissioning of New Capacity for the Extraction of Iron Ore  
 in the USSR  
 Under the Fourth, Fifth, and Draft Sixth Five Year Plans  
 1946-60

Period	Million Metric Tons			Fulfillment of Plan (Percent)
	Plan	Achieved	Shortfall	
Fourth Five Year Plan (1946-50)	N.A.	N.A.	N.A.	64.2 <u>a/</u>
Fifth Five Year Plan (1951-55) <u>b/</u>	67 to 68	41.2	26	60.4
1956 <u>c/</u>	20	10.0	10	50 to 52
1957 <u>d/</u>	20	14.0	6	70.0
1958 <u>e/</u>	16			
1959 <u>f/</u>	25			
1960	N.A.			
Sixth Five Year Plan (1956-60) <u>g/</u>	84			

a. 172/

b. The achievement of 41.2 million tons, the shortfall of 26 million tons, and the fulfillment of 60.4 percent, reported in source 173/, establish the plan at a range of 67 million to 68 million tons.

c. The only specific data available on 1956 are reports that the plan was fulfilled by 50 to 52 percent. 174/ At most, new capacity to process 10 million tons of ore per year is believed to have been commissioned in 1956, but it may well be that capacity for not more than 7 million tons was commissioned. This estimate is based on the following considerations. It seems quite unlikely that more than 20 million tons were planned for 1956. The average annual requirement under the draft Sixth Five Year Plan was only 17 million tons. Moreover, only 41 million tons had been commissioned during the entire previous 5 years. From the data presented on persistent lags in construction at projects for mining ore, it is evident that the construction carryover embodied in the shortfall of 26 million tons was well below the level which would have justified a plan for commissioning 26 million tons in 1956. Of the 17 iron ore mines planned for 1956, only 2 mines were commissioned. The commissioning of 10 million tons in 1956, therefore, implies that the 2 mines put into operation averaged 5 million tons in capacity, a generous estimate. On the other hand, it has been stated that the Ministry of Ferrous Metallurgy scattered resources on the construction of small mines in which

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Table 4

Commissioning of New Capacity for the Extraction of Iron Ore  
in the USSR  
Under the Fourth, Fifth, and Draft Sixth Five Year Plans  
1946-60  
(Continued)

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the capacity of each does not exceed 400,000 to 800,000 tons of ore per year. 175/ If, as a rough estimate, it is assumed that the 17 mines planned for 1956 averaged 800,000 tons capacity, the plan for 1956 can be approximated at 14 million tons of new capacity, with about 7 million tons achieved.

d. Estimated from data that the plan for 1957 called for commissioning mines with a total capacity of more than 20 million tons 176/ and that the initial plan for 1958 was raised by about 6 million tons because the plan for 1957 was not fulfilled (see footnote e, below).

e. The initial plan of 10,140,000 tons was later raised to 16,120,000 tons. 177/

f. 178/

g. 179/

Future prospects for ferrous metallurgy, both short-term and long-term, depend heavily on the success of the program for 1958-59 in constructing adequate facilities for mining and processing iron ore.

Assuming the estimated maximum commissioning of capacity to produce iron ore in 1956, approximately 24 million tons of new capacity were commissioned during 1956-57. Even if the plans for 1958-59 are fulfilled, a sizable task remains for 1960 -- new capacity approximating 19 million tons will have to be commissioned if the goal of the Sixth Five Year Plan is to be met. Numerous factors, however, complicate the realization. Commissionings in 1956 probably were significantly below the estimated maximum of 10 million tons. Fulfillment of the plans for 1958-59 is doubtful, judging directly from indications of continued lags in construction in 1957 and 1958. Indirect factors also challenge the plans for 1958-59. The setting of the initial plan for 1958 at 10 million tons and the plan for 1959 at 25 million tons was clearly a cutback in the plan for 1958 (compared with that of 1957) in order to permit at the same time building up the construction carryover to a size required for commissioning 25 million tons of new capacity during 1959. The revised plan for 1958, which seeks to make up the shortfalls in commissionings which occurred in 1957, seems bound to handicap the buildup during 1958 of the construction carryover which is required to meet the

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plan for commissioning in 1959. The further requirement for commissioning 19 million tons in 1960 would seem to entail an impossibly large buildup of construction carryover in the short space of 2 years.

Although the iron ore industry possibly will be assigned the necessary additional resources to fulfill the present construction plans for 1958-60, this action would result in a very sizable drain on available construction resources. Past experience has shown that something more than increased financial allocations is required. The production bases of construction organizations which build for the iron ore industry must be developed at accelerated rates, which requires time as well as construction resources, both of which presently are at a premium in the Soviet economy.

#### B. Coke and Pig Iron.

Although the commissioning of new capacity for producing both coke and pig iron was greater under the Fifth Five Year Plan than under the Fourth Five Year Plan, the planned tasks reportedly were considerably underfulfilled. 180/ A total of 20 blast furnaces was built during 1951-55, so that 10.3 million tons of new capacity in pig iron were commissioned. This capacity was only 87 percent of the plan; the shortfall in commissionings amounted to 1.5 million tons. 181/ The shortfall in construction of blast furnaces, although significant, was less than that in construction of facilities for iron ore and crude and finished steel.

The draft Sixth Five Year Plan stipulated that 45 coke batteries\* and 26 blast furnaces were to be commissioned during 1956-60. New capacity to produce 16.8 million tons of pig iron was to be commissioned. About 65 percent of the planned increase in production of pig iron in 1960 above that in 1955 was to be provided from the new capacity. 182/

##### 1. 1956.

During 1956, 5 coke batteries and 4 blast furnaces were constructed and put into operation by the Ministry for Construction of Metallurgical and Chemical Industry Enterprises. The plan for

\* These 45 batteries to be built by the Ministry for Construction of Metallurgical and Chemical Industry Enterprises are a minimum estimate of the total number to be built. The total planned probably was not more than 50, because the other metallurgical aggregates to be built by the Ministry for Construction of Metallurgical and Chemical Industry Enterprises were within 1 to 3 units of the respective totals for ferrous metallurgy as a whole.

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commissioning new capacity for production of coke, however, was fulfilled by only 48 percent, and the plan for pig iron by "less than 60 percent." Commissionings in pig iron capacity fell 1.4 million tons short of the plan,\* 183/ so that the pattern of performance in construction of blast furnace capacity during 1956 was as follows:

<u>Million Metric Tons</u>		
<u>Plan</u>	<u>Achieved</u>	<u>Shortfall</u>
3.5	2.1	1.4

The shortfall in commissionings in the first year of the Sixth Five Year Plan was nearly as large as the shortfall during the period of the Fifth Five Year Plan. Of the total commissionings planned for the 5-year period 1956-60, only 12 percent of the 21 percent planned for the first year was commissioned in 1956.

2. 1957.

The plan for 1957 stipulated that 8 coke batteries with a total capacity of 3.9 million tons of coke per year were to be constructed and put into operation by the Ministry for Construction of Metallurgical and Chemical Industry Enterprises, but the plan for commissioning new capacity to produce coke was not fulfilled in the first half of 1957. Not more than five coke batteries are estimated to have been commissioned by the end of the year. Thus the considerable lags in construction suffered in 1956 persisted through 1957. 185/

The plan for 1957 provided that new capacity to produce 2.1 million tons of pig iron per year (40 percent below the plan for 1956) would be completed and put into operation. The plan for 1957 also stipulated that three blast furnaces were to be commissioned. In contrast with accomplishments in 1956, it was announced that the plan for commissioning new capacity in pig iron was fulfilled and that the three blast furnaces were completed.\*\* 186/ Therefore, it is estimated that new capacity totaling 2.1 million tons was put into operation in 1957.

\* The blast furnace at the Voroshilovsk plant, 1 of 2 not commissioned in 1956, was put into operation early in January 1957. 184/ The shortfall reported for 1956 may overstate somewhat the seriousness of the lag in construction of blast furnaces.

\*\* If the Voroshilovsk blast furnace is included (see the footnote above), the number of blast furnaces, both planned and completed, would total four.

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3. Prospects for 1958-60.

In 1958, 9 coke batteries with a total capacity of 4.7 million tons per year are to be constructed and put into operation. Such an accomplishment would require considerable acceleration in construction because only 5 coke batteries were commissioned in each of the preceding 3 years. 187/

The plan for commissionings is in danger of being seriously underfulfilled again in 1958 because of the small amount of construction-installation work put in place during the first 5 months. Performance up to 1 June 1958 is summarized in Table 5.\* One of the principal factors in the threat to realization of the plan for 1958 is the negligible volume of construction carryover which had been achieved by 1 January 1958 at the following coke batteries: Yasinovsk No. 6, Novo Lipetsk No. 4, Bagleysk No. 8, and Voroshilovsk No. 4. This lack of construction carryover is, in effect, another indication of the failure to fulfill the plan for 1957, which had called for appreciable volumes of construction to be put in place at these very batteries. 188/

The degrees to which the plans for construction-installation work in 1958 were fulfilled, in conjunction with the planned dates of commissioning, indicate that construction schedules at nearly all the projects are due to be disrupted seriously unless work is greatly accelerated during the remaining part of the year. Reasons for the various delays are shortages of construction materials and construction equipment, long delays in the delivery of equipment for the coke batteries, delays in or absence of designs and specifications, and inadequate financial allocations for the volume of work to be done. 189/ Thus responsibility for the poor performance in construction is not that of the construction organizations only.

Unless a tremendous acceleration occurs in constructing coke batteries during 1958-60, the prospects for commissioning the 45 or more coke batteries called for in the draft Sixth Five Year Plan are distinctly unfavorable. Even if the 9 coke batteries planned for 1958 are completed, a total of 26 or more batteries would have to be commissioned during 1959 and 1960. Commissioning of this number of batteries would be no small task in view of the strong tendency, concomitant with persistent disruptions of planned schedules for commissioning coke batteries, to undercut the volume of construction carryover to levels which cannot support plans for commissionings in subsequent years.

\* Table 5 follows on p. 55.

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Table 5

Fulfillment of Planned Construction-Installation Work on Coke Batteries  
to Be Commissioned in the USSR in 1958 <sup>a/</sup>

Coke Battery	Total Estimate Cost of Project (Million Rubles)	Estimate Cost of Work for 1958 <sup>b/</sup> (Million Rubles)	Fulfillment of Plans for Construction-Installation Work (Percent)								Approximate Planned Date of Commissioning
			Monthly Plan				Annual Plan (by the End of)				
			February	March	April	May	February	March	April	May	
Yasinovsk No. 5	51.1	14.6	61	53	115		23	57	82	103	Commissioned <sup>c/</sup>
Voroshilovsk No. 3	35.4	33.4	15	19	19	112	27	50	70	81	30 June
Bagleysk No. 7	79.5	33.6	N.A.	62	36	55	15	17	26	34	31 August
Magnitogorsk No. 11	100.0	77.2	96	100	87	112	11	18	25	37	6 November
Cherepovets No. 4	28.7	19.8	N.A.	53	87	96	1	6	12	23	31 December
Voroshilovsk No. 4	18.7	18.2	1	2	3	83	4	5	9	20	30 September
Bagleysk No. 8	39.2	23.4	N.A.	N.A.	66	40	4	4	10	14	30 November
Novo Lipetsk No. 4	122.5	114.5	1	1	2	4	2	3	4	9	31 December
Yasinovsk No. 6	66.3	50.2	0	77	51	10	0	1	2	3	31 December <sup>d/</sup>

a. Progress up to 1 June 1958. All data are from source 190/.

b. The difference between the total estimate cost of the project and the estimate cost of work for 1958 is the volume of work put in place up to 1 January 1958 (that is, the volume of construction carryover). Data on costs have been revised for some of the projects. The latest revisions are cited.

c. Late by nearly 3 months.

d. Later postponed to late January 1959.

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The plans for 1958-59 stipulate that 7 blast furnaces are to be commissioned in 1958 and still another 7 in 1959. (Six of the latter are to be the largest in the USSR.) The newly commissioned capacity is to total 4.7 million tons of pig iron in 1958 and about 7 million tons in 1959.\* 191/ If the draft Sixth Five Year Plan is to be fulfilled, the pattern of achievements in 1956-57 and the plans for 1958-59, with the resultant requirements for 1960, are as follows:

<u>Years</u>	<u>Commissioning of New Capacity (Million Metric Tons)</u>	<u>Commissioning of Blast Furnaces</u>
1956 actual	2.1	4
1957 actual	2.1	3
1958 plan	4.7	7
1959 plan	7.0	7
1960 residual	0.9	5
1956-60 plan	16.8	26

Obviously the commissioning of 5 blast furnaces is not required to provide less than 1 million tons of new capacity in 1960 -- a vivid illustration of the decided trend toward building more blast furnaces with greater volumes than were envisioned in the Sixth Five Year Plan. Thus completion of 26 furnaces is no longer a necessary condition for meeting the plan for new capacity in pig iron. If the plan for commissionings (in tonnage) is achieved in 1958, an average of less than 4 million tons will be required in both 1959 and 1960. Depending on performance during 1958, therefore, prospects for fulfilling or exceeding the Sixth Five Year Plan for new capacity to produce pig iron are favorable.

Construction of seven blast furnaces during 1958 is a sizable increase above the volume of such work performed during 1957 and requires a well-coordinated program in the timely delivery of construction materials and equipment for the furnaces from many quarters of the economy. In recent years, Soviet builders have achieved some considerable reductions below the norms for the time required to construct many blast furnaces.\*\* Thus, even though the

\* New capacity commissioned in 1958-59 was to total almost the same amount as had been commissioned under the First and Second Five Year Plans together.

\*\* Whereas in recent years, blast furnaces (of a given size) were built in periods greater than 1 year, such furnaces are said to be erected at the present time in 8 to 7 <sup>7</sup> [footnote continued on p. 57]



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volume of construction carryover into 1958 apparently was less than anticipated in the plan for 1957, the reduced time presently required to build blast furnaces may be more than compensatory. Moreover, data available on construction through the first 4 months of 1958 indicate that construction is proceeding satisfactorily and that no serious problems are indicated. 193/ (See Table 6.\*) Prospects thus are favorable for fulfilling or exceeding the Sixth Five Year Plan for commissioning new capacity to produce pig iron.

C. Crude Steel.

Under the Fifth Five Year Plan, 44 open hearth and 13 electric furnaces were constructed and put into operation. As a result, new capacity for producing crude steel amounting to 8.9 million tons per year was commissioned during 1951-55, the same as under the Fourth Five Year Plan. Because the Fifth Five Year Plan was fulfilled by only 72 percent, the shortfalls in commissionings of capacity for crude steel are estimated to have been 3.5 million tons. 194/

The draft Sixth Five Year Plan provided for commissioning 38 open hearth furnaces, 44 electric furnaces, and 9 converters during 1956-60. Moreover, 18 oxygen plants were to be constructed and put into operation at metallurgical plants, whereas only 2 had been built under the Fifth Five Year Plan. New capacity for production of crude steel amounting to 15.8 million tons was to be commissioned, an increase of 78 percent above the total capacity commissioned during 1951-55. About 53 percent of the planned increase in production of crude steel in 1960 above that in 1955 was to be obtained from new capacity to be commissioned during 1956-60. 195/

1. 1956-57.

Soviet builders have achieved some success in reducing the time required to build open hearth furnaces. Nevertheless, construction schedules at other open hearth furnaces have not been met. One of the flagrant examples is that of the first open hearth furnace at the Orsk-Khalilovo Metallurgical Combine, which was scheduled to be put into operation during 1956. The lag in construction was such that the furnace was scheduled for operation by the end of the first quarter of 1958. 196/

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9 months. Although much of the data on reduction of construction periods are given with less than desirable precision, there is no doubt that significant reductions in time have been achieved. 192/

\* Table 6 follows on p. 58.

Table 6

Fulfillment of Planned Construction-Installation Work on Blast Furnaces  
to Be Commissioned in the USSR in 1958 a/

Blast Furnace	Total Estimate Cost of Project (Million Rubles)	Estimate Cost of Work for 1958 (Million Rubles)	Fulfillment of Plans for Construction-Installation Work (Percent)						Approximate Planned Date of Commissioning <u>b/</u>
			Monthly Plan			Annual Plan (by the End of)			
			February	March	April	February	March	April	
No. 3, of the Plant imeni Petrovsk	107.3	62.9	109	120	112	16	28	40	30 September
Chelyabinsk No. 5	113.4	97.2	104	104	103	13	25	37	5 November
Yenakiyevo No. 4	70.5	54.0	89	109	113	13	24	34	15 September
Azovstal' No. 5	119.2	103.2	81	88	100	9	18	32	15 September
Krivoy Rog No. 4	114.0	74.3	105	92	111	6	18	32	25 September
Orsk-Khalilovo No. 2	57.0	53.7	N.A.	122	112	7	17	30	15 September
No. 3, of the Plant imeni Il'ich	N.A.	79.0	104	120	143	4	13	17	25 December

a. Progress up to 1 May 1958. All data are from source 197/.

b. Except for Chelyabinsk No. 5 and Orsk-Khalilovo No. 2, the above schedules are approximately 1 week later than those planned earlier.

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During 1956, 3 open hearth furnaces were commissioned, but 2 other open hearth furnaces and 2 converters were not completed in spite of the plan. As a result of these and other failures in construction during 1956, the plan for commissioning new capacity for the production of crude steel was fulfilled by only 50 percent. 198/

During 1957, 6 open hearth furnaces and 2 converters were commissioned. (The plan for 1957 called for 8 open hearth furnaces.) Although some facilities for producing steel apparently were commissioned somewhat ahead of schedule in the first half of 1957, the plan for commissionings in the year as a whole was not fulfilled. 199/

In the report on the national economic plan for 1957 the Ministry of Ferrous Metallurgy and the Ministry for Construction of Metallurgical and Chemical Industry Enterprises were criticized for permitting consistent lags in construction and commissioning of oxygen stations. Nevertheless, 7 oxygen stations were commissioned during 1956, and 6 more were planned to be commissioned during 1957, accounting for 13 out of the 18 planned for 1956-60.\*

2. Prospects for 1958-60.

The plan for 1958 provides that 4 open hearth furnaces, 2 converters, and 14 electric furnaces, with new capacity totaling 2.5 million tons of crude steel per year, are to be commissioned. 201/ Although this figure is an increase of almost 20 percent above the estimated level of commissionings during 1957, it is 500,000 tons less than was called for by the plan for 1957. The record of commissioning of new capacity for production of crude steel during 1956-57 and the requirements for 1958-60 are as follows:

Year	Million Metric Tons			Fulfillment of Plan (Percent)
	Plan	Actual**	Shortfall	
1956***	2.8	1.4	1.4	50
1957****	3.0	2.1	0.9	70
1958	2.5			
1959-60	N.A.			
1956-60	15.8			

\* It is possible, however, that 3 of the 6 oxygen stations planned for 1957 are only expansions of existing stations rather than new ones. 200/

\*\* Estimated.

\*\*\* The data for 1956 are derived from the stated shortfall of 1.4 million tons and the 50-percent fulfillment of the plan. 202/

\*\*\*\* The plan for 1957, 3.04 million tons, was not fulfilled. 203/

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After the considerable failures encountered under the Fifth Five Year Plan, poor performances in 1956 and 1957 only emphasize the need for accelerated construction during 1959-60 if the Sixth Five Year Plan is to be fulfilled. The new capacity estimated to have been commissioned during 1956-57, in conjunction with the plan for 1958, leaves a requirement of nearly 10 million tons for 1959-60, or nearly 5 million tons in each of the last 2 years of the Sixth Five Year Plan. Even if the plan for 1957 had been fulfilled, nearly 9 million tons would be required in 1959-60. Thus not only should 2.5 million tons of new capacity be commissioned during 1958, but a considerable volume of construction carryover should be put in place during the year in preparation for the large increase in commissionings required in 1959.

The situation as of 1 July 1958 at the various furnaces and converters which are to be commissioned during 1958 is summarized in Table 7.\* The status of the five electric furnaces at the Zlatoustovsk Steel-Smelting Shop No. 3 is considerably less satisfactory than is apparent from Table 7. The scheduled commissioning during September was said to be dependent on performing the major volume of work in the first half of the year. Yet the financial allocations for the year were distributed erroneously in even shares over the first three quarters. Moreover, having established the schedule for commissioning in September 1959, Gosplan established the supply periods for much of the production equipment in the third and fourth quarters, while other production equipment is promised only for the first quarter of 1959. The shop was not commissioned, in spite of the fulfillment by the end of June of the work planned for the year, because the funds allocated were insufficient. 204/

Open hearth furnace No. 1 at Cherepovets, which was to have been commissioned during 1957, was rescheduled for the end of April. Although this project suffered serious shortages in such things as production equipment, cranes, and construction materials, it was commissioned on schedule. 205/

In addition to lagging construction at the Voroshilovsk Open Hearth No. 10 and the Zaporozh'ye Electric Furnace No. 6 during the first half of 1958, the situation was hardly favorable at the two electric furnaces of the Novo Lipetsk Steel-Smelting Shop, where serious problems in supply had arisen. 206/ At several projects, therefore, much the greater part of the work scheduled for the year remains for the last half of 1958. (See Table 7.)

\* Table 7 follows on p. 61.

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Table 7

Fulfillment of Planned Construction-Installation Work  
on Crude Steel Facilities  
to Be Commissioned in the USSR in 1958 a/

Steel Smelting Furnace	Total Estimate Cost of Project (Million Rubles)	Estimate Cost of Work for 1958 <u>b/</u> (Million Rubles)	Fulfillment of Plans for Construction-Installation Work (Percent)								Approximate Planned Date of Commissioning	
			Monthly Plan				Annual Plan (by the End of)					
			February	April	May	June	February	April	May	June		
Orsk-Khalilovo Open Hearth	38.0	0.4	100.0					100.0				Commissioned <u>c/</u>
Cherepovets Open Hearth No. 1	122.4	22.7	86.0					59.0				Commissioned <u>d/</u>
Zlatoustovsk Steel-Smelting Shop No. 3 (5 electric furnaces)	89.0	27.0	76.0	160	130	161		24.0	61	78	100	15 September
Krivoy Rog Converter No. 3	0.5	0.5	N.A.	<u>e/</u>	<u>e/</u>	<u>e/</u>		43.0	<u>e/</u>	<u>e/</u>	<u>e/</u>	30 September
Krivoy Rog Converter No. 4	1.3	1.3	N.A.	<u>e/</u>	<u>e/</u>	<u>e/</u>		43.0	<u>e/</u>	<u>e/</u>	<u>e/</u>	31 December <u>f/</u>
Chelyabinsk Steel-Smelting Shop No. 3 (6 electric furnaces)	91.8	32.0	100.0	101	107	117		22.0	43	54	68	25 December
Novo Lipetsk Steel-Smelting Shop (2 electric furnaces)	102.8	102.2	3.0	3	5	118		4.0	10	14	18	31 December <u>g/</u>
Cherepovets Open Hearth No. 2	22.6	18.5	0	100	170	118		2.0	9	25	37	31 December
Voroshilovsk Open Hearth No. 10	56.3	25.7	0.5	5	63	100		0.6	8	21	26	12 November <u>h/</u>
Zaporozh'ye Electric Furnace No. 6	32.0	21.8	0	N.A.	51	5		0	4	11	17	31 December

- a. Progress up to 1 July 1958. All data are from source 207/.  
b. Data on costs have been revised for some of the projects. The latest revisions are cited.  
c. Commissioned on schedule in late March.  
d. Commissioned on schedule in late April.  
e. No work was performed.  
f. Later revised to 4 January 1959.  
g. Later revised to 4 January 1959.  
h. Later revised to 31 December.

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A strong probability exists that even the modest plan for commissioning 2.5 million tons of new capacity for crude steel will not be met in 1958, unless extreme measures are taken to accelerate construction in the remaining months of the year.

D. Finished Steel.

Under the Fifth Five Year Plan, 28 rolling mills were constructed and put into operation. As a result, new capacity in the production of finished steel which was commissioned during 1951-55 totaled 6.4 million tons. This was, however, a fulfillment of only 56 percent of the plan for commissionings, the lowest percentage fulfillment of plans in the 4 basic branches of ferrous metallurgy. Thus the pattern established in construction of new capacity for production of rolled metals under the Fifth Five Year Plan was as follows 208/:

	<u>Million Metric Tons</u>
Fifth Five Year Plan	11.2
Achieved	6.4
Shortfall	4.8
Fulfillment (percent)	56.0

The draft Sixth Five Year Plan stipulated that 40 rolling mills (excluding shops of cold-rolled metals) were to be constructed and put in operation during 1956-60. New capacity to be commissioned during the period would total 16.3 million tons, an increase of 36 percent above the capacity commissioned under the Fourth and Fifth Five Year Plans together. By the end of the Sixth Five Year Plan, 60 percent of the increase in production of rolled metals (1960 compared with 1955) was to be obtained from new capacity commissioned during the period, whereas approximately 42 percent of the increase in production achieved under the Fifth Five Year Plan was obtained from capacity commissioned in 1951-55.\* 209/

1. 1956-57.

The poor performance in construction of rolling mills which characterized the period of the Fifth Five Year Plan persisted through 1956 and 1957. The plan for commissioning new capacity in

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\* The 42 percent under the Fifth Five Year Plan applies to the total increase of 12.6 million tons achieved by plants under the jurisdiction of the Ministry of Ferrous Metallurgy.

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rolled metals was not fulfilled during the first half of 1956, and by the end of the year the plan had been fulfilled by less than 60 percent. Of the 9 rolling mills which were to have been commissioned, 6 had not been put into operation by the end of 1956.

The plan for 1957 called for commissioning new capacity totaling 1.9 million tons, little more than had been achieved during 1956. Moreover, only six rolling mills were planned to be commissioned during 1957,\* thus providing no net increase above the number previously planned for 1956. As in 1956, the plans for commissionings were not fulfilled both for the first half of 1957 and for the year as a whole -- only 4 of the 6 rolling mills planned were put into operation. 210/

2. Prospects for 1958-60.

Although the claim has been made that the time required for constructing and commissioning rolling mills has been reduced from the previously required 3 to 4 years to 1 year, 211/ this period hardly can be considered the present average for Soviet builders. For example, the Stalinsk Light Section Mill was to be commissioned in 1954 but had not yet been completed as of 1 March 1958. 212/ Both the blooming mill and the continuous billet mill at Krivoy Rog were to have been commissioned during 1956; construction of both has stretched on into 1958. Some other rolling mills have been completed up to a year late. 213/

Plans for construction of rolling mills during 1958-60 should be examined in the light of the above-mentioned prolonged construction periods. The performance in construction of new capacity for rolled metals during 1956-57 was as follows:

\* Apparently a downward revision of an earlier plan for 1957, which had stipulated that nine rolling rolls were to be put into operation.

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Years	Million Metric Tons			Fulfillment of Plan (Percent)
	Plan	Actual	Shortfall	
1956*	2.8	1.7	1.1	60
1957**	1.9	1.5	0.4	80
1958	1.4***			
1959-60	N.A.			
1956-60	16.3****			

Even if the plan for 1958 is fulfilled, a tremendous increase in the construction and commissioning of rolling mills will be required in 1959 and 1960 if the goals of the Sixth Five Year Plan are to be fulfilled. The plan for 1958, however, has its own not inconsiderable obstacles.

Only 10 rolling mills were commissioned during 1955-57, yet a total of 7 are to be commissioned during 1958 alone. The equipment for a number of the projects was designed, produced, and delivered to the sites 6 to 7 years ago. Part of this equipment is outdated, and part has deteriorated. The necessary revisions, re-designing, and repairs to such units will require a great deal of work within the year. 218/ This requirement only highlights the fact that shortages and late deliveries of production equipment have been and continue to be much greater handicaps to meeting schedules for constructing facilities for finished steel than for any of the other branches of ferrous metallurgy.

The seven rolling mills to be commissioned during 1958, and the progress of construction-installation on the projects up to 1 June 1958, are itemized in Table 8.† Shortages of production

\* Because of the shortfall of 1.1 million tons, the plan for 1956 was fulfilled by less than 60 percent. 214/ The data on plan and actual, therefore, are maximum estimates.

\*\* Data on the plan are from source 215/. Even though only 4 of the 6 rolling mills planned were put into operation, as indicated above, it is estimated that approximately 80 percent of the planned new capacity was fulfilled.

\*\*\* This may understate the plan for 1958 to the exclusion of two intermediate processing mills, and the Krivoy Rog Blooming Mill (commissioned in March 1958). 216/

\*\*\*\* This goal of the draft Sixth Five Year Plan was restated in conjunction with the plan for 1958. 217/

† Table 8 follows on p. 65. The plan for 1958 is said to call also for commissioning eight rolling mills. This number probably includes the Krivoy Rog Blooming Mill, commissioned in March 1958, which is not included in the seven listed in Table 8.



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Table 8

Fulfillment of Planned Construction-Installation Work on Rolling Mills  
to Be Commissioned in the USSR in 1958 <sup>a/</sup>

Rolling Mill	Total Estimate Cost of Project (Million Rubles)	Estimate Cost of Work for 1958 <sup>b/</sup> (Million Rubles)	Fulfillment of Plans for Construction-Installation Work (Percent)						Approximate Planned Date of Commissioning
			Monthly Plan			Annual Plan (by the End of)			
			February	April	May	February	April	May	
Krivoy Rog Continuous Billet Mill	50.9	19.0	68	75		10	39		Commissioned <sup>c/</sup>
Nizhniy Tagil Heavy-Section Mill "650"	124.0	113.5 <sup>d/</sup>	100	101	100	8	25	34	20 December
Cherepovets Blooming Mill	83.6	62.1	79	70	75	10	16	24	31 December
Ashinsk Sheet Mill (Chelyabinsk)	45.8	28.0	95	195	70	8	20	33	5 December
Magnitogorsk Slab Mill	128.0	68.6	75	90	78	5	15	23	5 December
Krivoy Rog Light-Section Mill No. 2	65.7	N.A. <sup>e/</sup>							5 December <sup>f/</sup>
Dneprodzerzhinsk Rolling Mill	17.5	N.A. <sup>g/</sup>							5 December

a. Progress up to 1 June 1958. All data are from source <sup>219/</sup>.

b. Data on costs have been revised for some of the projects. The latest revisions are cited.

c. Planned for 30 April; actually commissioned on 18 June.

d. Because this is a substantial upward revision of the initial plan of 80 million rubles, the percent of fulfillment of the annual plan by the end of February and April have been adjusted from those given in relation to the initial plan.

e. Work was not being performed.

f. Previously scheduled for 30 September.

g. Work was not being performed.

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equipment and construction materials handicapped construction of the Krivoy Rog Billet Mill and the Cherepovets Blooming Mill. The situation at the Dneprodzerzhinsk Rolling Mill was even worse than at the other projects; the investment allocated for work to be done in 1958 was less than one-half of that required. Similarly, financing had not been provided for the Krivoy Rog Light Section Mill (see Table 8). Inadequate supplies of labor, construction equipment, and structural metal handicapped construction at the other projects. 220/ In sum, by the end of the first 5 months of 1958, insufficient progress in construction at the majority of the projects was threatening fulfillment of the plan for new capacity in 1958.

Although the amount of new capacity planned for commissioning in 1958 is low, the volume of construction-installation work required in support of the plan is quite large. This requirement has been attributed to mistakes in planning -- many of the rolled metals projects were still in the stage of designing or had little construction work put in place by the beginning of 1958. 221/ That there has been no significant increase in the volume of construction put in place on projects not yet commissioned is strongly supported by the fact that the underfulfillment of the Fifth Five Year Plan was accompanied by a steady decline in the plans for commissioning new capacity set for 1956, 1957, and 1958. The difficulties already encountered in construction during 1958 are not conducive to a reversal of this situation, and a serious compromise of the plans for new capacity in 1959-60 and under the Sixth Five Year Plan appears likely.

E. Problems and Prospects.

Many of the causes and factors contributing to the persistence of shortfalls in construction of ferrous metallurgical facilities in general are similar to those outlined above in respect to construction of iron ore facilities. Late deliveries of production equipment to construction sites, however, have been a considerably greater hindrance to meeting schedules for construction of facilities for pig iron and crude and finished steel than they have to meeting schedules for constructing facilities for iron ore. Construction organizations, in most of such cases, are not responsible for the delays in construction engendered by tardy deliveries of production equipment. During 1957, 14 ferrous metallurgical projects were not commissioned, because of late deliveries of production equipment, yet 8 of these were fully completed as far as construction work was concerned. On the other hand, equipment has been known to accumulate at a number of projects over periods of 6 or 7 years without being installed. The responsibility may lie with the planning, client, or construction organization. 222/

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Construction is frequently held up through the fault of designing organizations. Specifications, designs, and working drawings often are delivered late to construction organizations, principally because the designing organizations of the Ministry of Ferrous Metallurgy and of the Ministry for Construction of Metallurgical and Chemical Industry Enterprises were inadequately staffed with skilled personnel. The Ministry of Machine Building and other ministries concerned also were responsible in part for delays in designing construction projects such as rolling mills and electric furnaces because of their failure to provide the initial data on equipment, data which were required in the drafting of working drawings. One of the most serious and pervasive handicaps to construction organizations has been the long delays encountered in the delivery of designs and specifications for those subsidiary construction material enterprises required in the buildup of operative bases for construction organizations. The accelerated output of designing organizations necessary to support the planned acceleration in construction of ferrous metallurgical facilities under the Sixth Five Year Plan and under the initial plans for 1956 and 1957 has not materialized. Upward revisions in the construction programs during both 1956 and 1957 have entailed additional lags between the required and actual dates of deliveries of designs and drawings. 223/ Although it is perhaps too early for firm conclusions, there have been some indications that the realignment of designing organizations carried out under the reorganization of industry and construction has complicated rather than resolved many of the problems implicit in the inadequate staffs available to designing organizations. 224/

Closely allied with delays in providing construction organizations with the required designs and specifications is the frequent practice of starting construction on projects and putting them well under way without drawings, specifications, or cost estimates. Many projects are included in the annual plans for construction without having met the standing requirement that cost estimates and specifications be approved by 1 October of the preceding year. Both the former Ministry of Ferrous Metallurgy and the State Economic Commission have been accused of engaging in such practices. 225/ Although these conditions have improved somewhat of late, they apparently still handicap the efficient organization of the construction effort in the ferrous metallurgical industry.

The duration of construction of both new plants and expansions of established plants is considerably longer than necessary. Soviet designers have established the duration of construction of a metallurgical plant with the full cycle of production at 5 to 7 years. Yet from start to finish construction of such metallurgical combines as the Transcaucasian (in Rustavi) and the Cherepovets, Orsk-Khalilovo,

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Novo Lipetsk, and Karaganda will have spanned 10 to 15 years or more. 226/ The simple relationship between the actual cost of construction of these projects and the estimate cost is seriously inadequate in expressing the cost to the economy of prolonged construction periods. (For example, the actual costs of at least the first three of the above-mentioned combines are diverging insignificantly from the estimate costs. 227/) What is important is the degree to which investments are made and thereby tied up in inoperative fixed assets longer than necessary, contributing to increasing capital cost per ton of added capacity.

Prolonged periods of construction can be said to result generally from two factors: (1) the annual investments made in the given project are too low in relation to the estimate cost of the project (which results from the inability of the construction organization to perform a greater volume of work and/or from the fact that annual financial allocations for investments are too low), and (2) the volume of construction and/or financial resources available to ferrous metallurgy as a whole is dispersed among too many projects. One of the most startling examples of low investments made annually on a given project is the Karaganda Metallurgical Plant, at which work amounting to less than 15 percent of the estimate cost had been put in place 11 years after construction began. 228/ A measure of the dispersion of resources in ferrous metallurgy as a whole is available in the volume of unfinished construction.

The volume of unfinished construction is defined as the volume of investment allocated to projects not yet put into operation.\* The index of growth in the volume of unfinished construction in ferrous metallurgy, as of 1 January of the respective years, is as follows:

	<u>1947 = 100</u>
1947	100
1951	227
1955	303
1956	303
1957	More than 333

\* As such, it has its positive side in that it also represents the volume of construction carryover. Generally, however, the term unfinished construction is used in its negative sense, and the term construction carryover (zadel) is used in the positive connotation. See the first footnote on p. 43, above.

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Over the 10-year span the volume of unfinished construction more than tripled. Although only a rough comparison can be made; it is clear that increasingly smaller shares of annual capital investment in ferrous metallurgy have been devoted to putting unfinished facilities into use.\* From time to time, annual plans apparently have called for some reduction in the volume of unfinished construction. The temporary holding of the line during 1955 (unfinished construction increased a mere 36 million rubles) indicates some success in concentrating resources in the last year of the Fifth Five Year Plan, in contrast with the quite unsuccessful attempt in the last year of the Fourth Five Year Plan. 229/ Unfinished construction rose again in 1957, and there have been some initial indications that dispersion of construction resources is continuing in spite of the reorganization of industry and construction. 230/

At the root of the continuing shortcomings in construction for ferrous metallurgy, however, are the inadequate resources of construction organizations and the poor organization and planning of capital construction. Labor turnover is high because the structure of wages for construction workers in ferrous metallurgy is still unsatisfactory. The burden of the inadequate productive bases of construction organizations is increased by late deliveries of the required designs, production equipment, and construction materials. Among the branches of industry, construction for ferrous metallurgy no longer holds a most favored position in the allocation of construction resources. In many instances the construction organizations for the ferrous metallurgical industry are more poorly supplied than are those construction organizations of other branches which do not require as large an input of metals and cement (per million rubles of construction-installation work performed). Another indication of declining priorities is the fact that the Ministry for Construction of Metallurgical and Chemical Industry Enterprises devoted over the years less and less of its total volume of construction-installation work to construction for ferrous metallurgy. In short, the buildup of the resources of construction organizations which was required to fulfill the accelerated construction program for ferrous metallurgy during the Sixth Five Year Plan has not taken place. 231/ In fact, the construction materials base, labor force, and construction equipment at their disposal are of a size which would prejudice fulfillment of construction plans even if those resources were brought to an optimum concentration.

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\* This fact is deduced from data indicating that the rate of increase in unfinished construction considerably exceeded the rate of increase in annual capital investments over the period.

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Improvements in the organization and execution of construction undoubtedly would alleviate some of the strains engendered by the gulf between plans for capital construction and the capabilities to fulfill those plans. Many ferrous metallurgical construction organizations are charged with building candy factories, schools, and other such structures outside their special capabilities, thus depleting the already insufficient resources available for building metallurgical enterprises and the required housing. On the other hand, construction of complex metallurgical units is at times charged to organizations obviously not geared for such specialized types of industrial construction. Construction organizations frequently are guilty of ignoring time schedules for putting facilities into operation in favor of engaging their resources in "profitable" construction jobs: that is, types of work which have a high reporting value and require fewer inputs than "unprofitable" jobs. Unprofitable jobs, such as finishing work, require large inputs of time and labor with little return in terms of the reported volume of construction-installation work performed. The general contractor apparently exerts little control over such manipulations on the part of subcontractors, primarily because he is not obliged to. 232/

Greater concentration of construction resources on the most important projects and those which are nearing completion would do much to improve the organization of the construction effort. The dispersion of construction resources among too many projects, however, is a corollary of planning a construction program much larger than warranted by the resources made available to construction organizations building for the ferrous metallurgical industry. Mistakes in the planning of capital construction, therefore, are most basic to the persistent failures to construct and commission projects on time. The errors in planning take several forms. For example, in many cases the initial estimate costs of projects which are to be commissioned within a given period are subjected to considerable upward revisions after construction has been started, thus delaying commissioning of the projects from year to year while the increased volume of work is being performed. There also are frequent instances in which priorities for given projects and plans for construction-installation work are raised in spite of the demonstrated inability of the responsible construction organizations to perform even the volumes of work previously assigned them. In the midst of a general scarcity of investment resources, there has been a strong tendency to postpone necessary investments much longer than is wise. For example, in the Krivoy Rog area, construction of ore-concentrating plants was postponed much too long, with the result that the depletion of the richer ores was not accompanied by a simultaneous development of the concentrating facilities required to process the poorer ones. The great acceleration of construction is prevented by the small number of large construction trusts in the area. 233/

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Some of the defects in the planning of capital construction undoubtedly are explained by the fact that estimates of investment costs in the ferrous metallurgical industry frequently require revision especially with respect to facilities for mining and processing ore. 234/ At the center of the problem, however, is the disagreement as to the volume of investment required to support short- and long-term goals for production of iron and steel. This disagreement was explicit in the speeches made at the Twentieth Party Congress by M.Z. Saburov (then Chairman of the State Economic Commission) and A.G. Sheremetyev (then Minister of Ferrous Metallurgy).

Saburov criticized the Ministry of Ferrous Metallurgy for requesting both excessively large capital investments and low production targets. In attempting to prove that the Ministry was not taking full cognizance of its possibilities for expanding production at established enterprises, Saburov noted that although the plan for commissioning rolling mills was underfulfilled by 4.8 million tons under the Fifth Five Year Plan, production of rolled metals exceeded the plan by 0.7 million tons. Sheremetyev, on the other hand, insisted that the planned assignments in production for 1956-60 could not be met unless the projects planned were commissioned on schedule. He emphasized that the weak spot of the ferrous metallurgical industry in all the postwar years had been capital construction; that construction organizations were not large enough -- that is, their resources were inadequate -- to perform the assigned tasks; and that as a result of failure to commission 26 million tons of iron ore capacity under the Fifth Five Year Plan, the swift building up of capacity to produce pig iron, steel, and rolled metals was being delayed. 235/ The lines thus were drawn clearly, with the central planners on one side and the technologists administering the iron and steel industry on the other.

Events in 1956 and 1957 have substantiated the position of Sheremetyev. The failure to meet time schedules for important ferrous metallurgical projects has been a strong deterrent to meeting production plans in the short run of 1956 and 1957, and most assuredly is limiting production increases over the long run of 1958-60 and subsequent years. 236/

The feasibility of correcting the imbalance between production goals and construction achievements in the near future depends heavily on the status of the volume of construction carryover in ferrous metallurgy. The fulfillment of planned commissioning of productive capacity in ferrous metallurgy in recent years is summarized as follows:

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<u>Product</u>	<u>Fulfillment of Plans</u> <u>(Percent)</u>		
	<u>Fifth Five Year Plan</u>	<u>1956</u>	<u>1957</u>
Iron ore	60	50	70
Pig iron	87	60	100
Crude steel	72	50	70
Finished steel	56	60	80

The persistent failure to fulfill the plans for commissioning new capacity is the strongest indication that the volume of construction carryover has not been large enough to support the annual plans for completion of new productive facilities. Thus, in spite of the growing volume of unfinished construction, it is seriously doubted that that part which is in the usable form of construction carryover is large enough to permit the construction industry to achieve its goals by concentrating resources on the completion of projects well under way.

The plan for 1957 had called for limited increases in production while concentrating construction resources on eliminating the imbalance between production and construction. Except for construction of pig iron facilities, however, the attempt was largely unsuccessful, and the prospects are the same for 1958. The important characteristic of the initial plans for construction in 1958-59 is that they were integrated with the long-term program envisioned for 1959-65, but the long term development envisioned for the industry is again being prejudiced by the threat of continued serious failures in construction during 1958. The present problem in construction is one which can be corrected only by initiating and continuing larger scale allocations of both physical and financial resources to ferrous metallurgy or by substantial reductions in the planned construction programs.

In fixing responsibility for the failures in construction for the ferrous metallurgical industry, the central planning organizations have displayed a distinct tendency to blame the Ministry of Ferrous Metallurgy and the Ministry for Construction of Metallurgical and Chemical Industry Enterprises for weaknesses in building practices; the Ministry of Ferrous Metallurgy to blame the central planners for serious errors in planning investments and the construction organizations for weak performance; and the Ministry for Construction of Metallurgical and Chemical Industry Enterprises to blame both the central planning organizations and the Ministry of Ferrous Metallurgy for erroneous planning practices. In the well-reasoned report on the



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national economic plan for 1957, however, M.G. Pervukhin was careful to spread the blame among the Ministry of Ferrous Metallurgy, the Ministry for Construction of Metallurgical and Chemical Industry Enterprises, Gosplan, and the State Economic Commission. 237/

Up to the time of the theses on the reorganization of industry and construction, the organizational remedies proposed were similar. Sheremetyev advised either strengthening the construction organizations of the Ministry of Ferrous Metallurgy and the Ministry for Construction of Metallurgical and Chemical Industry Enterprises or creating a special ministry for construction of ferrous metallurgical enterprises. I.P. Bardin trenchantly observed that the separation of production and construction in ferrous metallurgy was erroneous and that merging construction of ferrous with nonferrous metallurgy and the chemical industry only complicated matters. 238/ Both proposals, however, were important not for the explicit suggestion of the need for reorganization but for the implicit fact that such reorganization of construction would award greater bargaining power to the ferrous metallurgical industry in the scramble for scarce investment resources. It is doubtful that the reorganization of industry and construction which has taken place will resolve any of the major shortcomings in construction, and it may even handicap construction by reducing the size of organizations building for the ferrous metallurgical industry.

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#### IV. Coal Industry.

The volume of investment resources accorded the coal industry of the USSR is even greater than that for the ferrous metallurgical industry. Approximately 11 percent of the total volume of state capital investment was directed into the coal industry\* during the period of the Fourth Five Year Plan (1946-50) and about 8 percent during the period of the Fifth Five Year Plan (1951-55). The draft Sixth Five Year Plan (1956-60) called for about 10 percent.

Within the industrial sector, according to the draft Sixth Five Year Plan, about 16 percent of state capital investment in industry was planned to be allocated to the coal industry. Of the more than 400 billion rubles of state capital investment which were to be allocated to the heavy industries previously listed,\*\* approximately one-fourth was to be allocated to the coal industry.

Capital investments under the Fourth Five Year Plan enabled the commissioning of new productive capacity in the extraction of coal totaling 107.3 million tons, of which approximately 101 million tons were commissioned for the Ministry of the Coal Industry.

Under the Fifth Five Year Plan, new productive capacity amounting to 116.1 million tons was commissioned (approximately 112 million tons for the Ministry of the Coal Industry). The Fifth Five Year Plan of construction-installation work for the Ministry of the Coal Industry was fulfilled by 107 percent, yet the 5-year plan for commissioning new capacity was fulfilled by only 85.4 percent, a shortfall of 20 million tons.\*\*\* 241/

##### A. Draft Sixth Five Year Plan (1956-60).

The draft Sixth Five Year Plan provided that new mines and pits with a total capacity of approximately 240 million tons would be commissioned for the Ministry of the Coal Industry during

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\* The data refer to the former Ministry of the Coal Industry, which accounted for 96 percent of total coal production in 1955 and was to account for 96 percent in 1960. 239/ The reported volume of 46.7 billion rubles of capital investment during 1951-55 and the increase of 108 percent planned for 1956-60 are presumed to refer to state capital investments. Percentage shares were estimated from data in source 240/.

\*\* See III, p. 33, above.

\*\*\* The initial announcements of results of the Fifth Five Year Plan indicated a fulfillment of about 83 percent in commissionings and a shortfall of 21 million tons. 242/

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1956-60,\* an amount greater than that commissioned under the Fourth and the Fifth Five Year Plans together. Average capacity of the mines and pits commissioned during 1956-60 was to be 2.4 times that of the average size during 1951-55. The changing regional shares in commissioning of new capacity during 1946-55 and the projected shares during 1956-60 are as follows:

<u>Basin or Area</u>	<u>Total Commissionings</u> (Percent)		
	<u>1946-50</u>	<u>1951-55</u>	<u>1956-60</u>
Donbas	53	34	36
Moscow Basin	N.A.	N.A.	10
Kuzbas	7	16	13
Urals	9	9	9
Karaganda	3	9	11
East Siberia	N.A.	7	8

One of the most important tasks set for mining construction under the Sixth Five Year Plan was the goal of reducing the period required for construction of coal mines by 33 to 50 percent, generally to a duration of 2 to 4 years. The tempo of shaft-sinking was to be approximately doubled in order to facilitate reduction of construction periods. 244/

In contrast with the 45 coal concentrating plants commissioned during 1951-55, the Sixth Five Year Plan called for 82 plants with a total capacity of 113 million tons, or 2.6 times the capacity commissioned under the Fifth Five Year Plan. Fulfillment of the Sixth Five Year Plan for production of coke was said to depend to a considerable extent on completion of the new plants on schedule: for

\* In a pamphlet published several months after the ratification of the draft Sixth Five Year Plan, the former Deputy Minister of the Coal Industry stated that under the plan commissionings of coal mining capacity were to total 254.4 million tons, but this figure included the capacity of reconstructed mines. The itemized plans for basins and areas total 239 million tons and presumably exclude approximately 15 million tons of capacity in the form of reconstruction. The draft plan for 240 million tons of commissionings, therefore, apparently was not changed. In a review of achievements on Miners' Day the issue of Ugol' for August 1957 stated that mines and pits with an annual designed capacity of almost 200 million tons were to be constructed during 1956-60. In a review of achievements on the 40th anniversary of the Soviet regime, however, the same journal for November 1957 again stated the goal of 240 million tons. 243/

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example, the concentration of coal for coking at the new plants was to constitute, in respect to the share of the volume of concentrated coal in the given regions in 1960, about 30 percent of production in the Donbas, 20 percent in the Kuzbas, and 60 percent in Karaganda. 245/

The former Ministry for Construction of Coal Industry Enterprises commissioned 80 percent of the new capacity put into operation in the Ministry of the Coal Industry during 1951-55. Its share under the Sixth Five Year Plan was to rise to 88 percent. Thus, during 1956-60, it was assigned the task of commissioning 330 new mines and pits with a total capacity of 210 million tons (of which 136 with a capacity of approximately 75 million tons -- nearly 3 times the new capacity put into operation there during 1951-55 -- were to be built in the Donbas). In open pit mines the Ministry for Construction of Coal Industry Enterprises was to start the construction of 30 new pits with a total annual capacity of more than 75 million tons compared with 13 which were put into operation during 1951-55 with an annual capacity of 18.6 million tons.\* 246/

The directives on the draft Sixth Five Year Plan had stipulated that 35 percent of the planned increase in production of coal in the USSR in 1960 above that of 1955 was to be obtained through better organization of production and more efficient utilization of existing production capacity. Conversely, approximately 65 percent of the increase in production of coal was to be obtained from new capacity put into operation during 1956-60. This interpretation is substantiated by the following data on the Ministry of the Coal Industry. Extraction of coal in 1955 by the Ministry of the Coal Industry was 128 million tons greater than in 1950. More than 74 million tons, or 58 percent, of the increase was obtained from mines and pits commissioned during 1951-55. Timely construction and commissioning of new capacity during 1956-60 was to be even more important in meeting production goals because 130 million to 135 million tons of the planned production increase of 194 million tons in the Ministry of the Coal Industry was to be obtained from capacity to be put into operation during the period. The commissioning of about 240 million tons of new capacity for the Ministry of the Coal Industry was to be the means of obtaining from 67 to 70 percent of the planned increase in coal extracted by the Ministry of the Coal Industry under the Sixth Five Year Plan. 247/

\* Apparently 24 pits were commissioned during 1951-55 (capacity unknown), including the 13 built by the Ministry for Construction of Coal Industry Enterprises.

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The urgency of the construction program for the coal industry under the Sixth Five Year Plan was appraised accurately by the Minister of the Coal Industry at the Twentieth Party Congress. He noted that planned commissionings of new mining capacity were considerably underfulfilled during 1951-55, whereas utilization of designed capacity of mines rose from 84 percent in 1950 to 95.8 percent in 1955. Utilization of capacity in 1960, including mines to be constructed under the Sixth Five Year Plan, was expected to rise to 97.5 percent. The anticipated declines in reserve mining capacity made manifest the need for a review of the program for mine construction already drawn up under the Sixth Five Year Plan. The Minister expressly criticized Gosplan and the State Economic Commission for setting the scales and rates of mine construction too low, especially in the Donbas. 248/

The Chairman of the State Economic Commission, on the other hand, accused the Ministry of the Coal Industry of submitting an unjustifiably low draft production plan for 1956 and accompanying it with greatly inflated requests for capital investment which were in keeping neither with the existing resources of the economy nor with the actual needs of the Ministry. He emphasized that the possibilities of expanding production at existing enterprises were being underestimated by noting that although the target for commissioning new extractive capacity in the coal industry during 1951-55 was underfulfilled by about 20 million tons, the target for production was exceeded by 18 million tons. 249/ As in the case of the ferrous metallurgical industry, therefore, the speeches at the Twentieth Party Congress clearly indicated a basic disagreement between administrators and planners as to the amount of construction required to support the targets for production.

B. 1954-56.

The Fifth Five Year Plan for construction-installation work for the Ministry of the Coal Industry was exceeded by 7 percent, whereas that for commissioning new capacity was fulfilled by only 85 percent. This disparity is clarified somewhat by an examination of performance during 1954-56, as follows 250/:

<u>Year</u>	<u>Fulfillment of Plans</u> (Percent)	
	<u>Construction-Installation</u> <u>Work</u>	<u>Commissioning of New</u> <u>Capacity</u>
1954	91	78
1955	89	47
1956	99	56

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The Ministry for Construction of Coal Industry Enterprises performed even worse. Its plans for construction-installation were fulfilled by 84 percent in 1955 and by 86 percent in 1956 (the poorest record of fulfillment of any of the 7 construction ministries). 251/ The Ministry should have commissioned 92 mines with a total capacity of nearly 40 million tons in 1956, but only 48 mines with a total capacity of 18.5 million tons were completed, or about 46 percent of the plan. Matters were scarcely any better in the Ukrainian SSR, where the Ministry for Construction of Coal Industry Enterprises, Ukrainian SSR, fulfilled its plan for construction-installation by 88 percent and commissioned only 14 of the planned 38 mines. 252/

As a result, the decided shortfalls in planned commissionings in 1954-55 were not reversed in 1956. Although the Ministry of the Coal Industry used nearly all its investment allocations under the state plan and virtually fulfilled its planned volume of construction-installation work, only 28 million tons of the planned 50 million of new capacity were put into operation -- a shortfall of 22 million tons.\*

In the first year of the Sixth Five Year Plan, therefore, the judgment of the Minister of the Coal Industry proved to be correct. Before the year was out, the Central Committee and the Council of Ministers, USSR, had issued a decree on "Urgent Measures for Overcoming the Lag in Mine Construction in the Ukrainian SSR." One of its most important measures stipulated that construction of an additional 35 mines, with a total annual capacity of 6 million tons, was to be started immediately, and all 35 were to be commissioned in the fourth quarter of 1957. 255/

C. 1957-58.

In view of the failures in 1956, the plan for 1957 was directed toward accelerating the rate of commissioning of new mines and pits. A target of 42.7 million tons of new capacity was set (54 percent to be in the Donbas), in contrast with the average of 23 million tons achieved during 1951-55 and the 28 million tons put into operation in 1956. The goal for 1957, however, was several million tons less than the plan for 1956.\*\*

\* A fulfillment of 49 percent was announced initially, and 54 percent has been stated elsewhere. The fulfillment of 56 percent and the shortfall of 22 million tons, however, constitute the most consistent statement. 253/ The corresponding data for the Ukrainian SSR represented a fulfillment of 50 percent of the planned new capacity. 254/

\*\* Some time later in 1957 the plan for commissioning new capacity apparently was raised to 46 million tons. 256/

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Capital investments in the coal industry were to be raised by 15 percent from the 15.3 billion rubles made in 1956 to 17.6 billion in 1957, with two goals in mind: (1) to facilitate fulfillment of the plan for commissioning new capacity and (2) to increase the construction carryover for commissioning new capacity in subsequent years. As an additional insurance for fulfilling the plan for new capacity, the Industrial Bank of the USSR (Promyshlennyy Bank -- Prombank) reviewed the construction schedules of above-limit\* projects in the coal industry for 1957, reduced the funds for starting new projects, and concentrated these funds instead on completion of projects. As a result, the average assignment per mine was raised by 20 percent above the average in 1956. 257/

The plan for construction-installation work in the coal industry was exceeded both for the first half of 1957 and for the year as a whole. The plan for capital investment was exceeded also, so that investments were increased by 17.9 percent above those made in 1956,\*\* with an increase of 33 percent in the Ukrainian SSR. Although some difficulties were experienced in constructing the 35 Komsomol mines in the Donbas, 19 of them were commissioned ahead of time (on the 40th anniversary of the October Revolution), and the remainder were commissioned by the end of December. 259/

The unhappy combination of fulfillment of plans for construction-installation work and serious underfulfillment of plans for commissioning new capacity emerged again in 1957. In the first half of 1957, instead of 18.9 million tons of new capacity, only 36 percent of the plan was commissioned.\*\*\* By the end of the year, although new capacity commissioned amounted to about 35 million tons, an increase of 24 percent above the commissionings achieved in 1956, the revised plan for 1957 had been fulfilled by only 76 percent (or 82 percent of the initial plan for 1957). 260/ In the Ukrainian SSR, new capacity totaling 15.5 million tons was commissioned, compared with 11.2 million tons in 1956. The plan had been to commission new capacity of 21.9 million tons in 1957,\*\*\*\* however, so that the plan for the Ukrainian SSR was fulfilled by only 71 percent. 261/

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\* In Soviet planning an above-limit project is defined as a project which is expected to cost more than a certain amount, ranging from a minimum level of 5 million rubles for an administrative project to 25 million rubles for most projects in heavy industry.

\*\* The 21-percent increase stated in the report of plan fulfillment for 1957 is not strictly comparable. 258/

\*\*\* The source, however, also stated that 4.7 million tons were commissioned, which would imply a 25-percent fulfillment.

\*\*\*\* This figure is several million tons below that implied for the Ukrainian SSR in the national economic plan for 1957: that is, the national economic plan called for 23 million tons in the Donbas compared with 20.6 million tons stated in the Ukrainian plan for 1957.

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Capital investments in the coal industry are to be increased only slightly in 1958, but the volume of work strictly for mining construction is to be increased by 12 percent above the work performed during 1957. The commissioning of new capacity is to be increased by 10.5 percent to about 39 million tons -- an increase of only 4 million tons above the new capacity commissioned during 1957.\* (Twenty-one open-pit mines with a total capacity of 44.3 million tons are to be under construction in 1958, more than 9 million tons of which are to be commissioned during 1958, or approximately one-fifth of the total new capacity to be commissioned.) Along with the considerable shortfall in new capacity during 1957, it appears that the construction carryover fell noticeably short of the goal in spite of careful stipulation to the contrary in the plan for 1957.

This fact is substantiated further by the plan for 1958, which acknowledges the strains to be imposed during 1958 by an acceleration in the buildup of construction carryover. During 1958, mines and pits scheduled for commissioning in 1959 are to have more than 68 percent of the estimate cost of the given projects put in place by 1 January 1959, in contrast with 1957, when approximately 63 percent of the estimate cost of the mines and pits which were to be commissioned during 1958 had been put in place by 1 January 1958. 263/

D. Problems in Construction.

1. Shortages of Construction Resources and High Costs.

Severe shortages in construction materials and labor and, to a lesser extent, shortages in construction equipment and in housing have been and continue to be among the most serious handicaps to meeting schedules for construction of coal mines in the USSR. Shortages in construction materials have been experienced throughout the USSR, especially in the Ukrainian SSR. In Voroshilovgrad Oblast, for example, construction organizations building coal mines received 25 to 30 percent less than the required quantity of bricks, rock products, and other local building materials during 1956, and the problem apparently persisted through 1957. In regard to the Donbas, the perhaps extreme claim has been made that 40 percent of the working time in construction of mines is lost because of late deliveries of building materials, including mine props and concrete. 264/

\* A 1958 plan of 37.1 million tons was mentioned in late 1957, and another of 35.7 million tons in March 1958, although the latter goal may have applied only to "large" mines. 262/

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At least through 1956, organizations responsible for construction of coal mining facilities either were inadequately provided with construction equipment or were utilizing poorly the equipment available, with the result that mechanization of mining construction lagged behind plans. 265/

Shortage of labor in mining construction is still a serious handicap. A shortfall in commissioning of new capacity occurred again in 1957 and was, to a considerable extent, the result of a shortage of construction workers on projects which were to have been put into operation during 1957. During the first half of the previous year, 1956, mines to be commissioned in the Ukrainian SSR had had 4,500 to 5,500 fewer construction workers than were required. Another measure of the severity of the labor shortage is implicit in the decree on accelerating construction of mines in the Donbas in late 1956, to the effect that 25,000 young construction workers were to be recruited in the fourth quarter of 1956 and the first quarter of 1957 -- a sizable addition to the 150,000 workers then constructing mines in the Donbas. Again in the Donbas, idle time of construction workers is excessive, frequently reaching 2 to 3 hours per shift, and productivity is low. Much of the idle time, of course, is caused by the severe shortages and late deliveries of construction materials noted above.

The shortages of both unskilled and skilled construction workers, including engineering and technical workers, suffered at mining construction sites throughout the USSR are complicated further by the high turnover of such personnel. Much of the excessive turnover is the result of a shortage of adequate housing facilities, low wage and salary scales, and insufficient provision for increasing the skills of workers through training. Although some provisions were made for accelerating construction of housing for mine construction workers and increasing the wage and salary scales, at least in the Donbas, labor shortages and high turnover continued to handicap the scheduled completion of mines throughout 1957.\* 266/

In view of the prevalence of shortages of construction materials and labor, it is not unexpected that costs of construction have been considerably higher than planned. For example, in the Ukrainian SSR costs of construction exceeded estimates by approximately

\* Fulfillment of the general plans for construction-installation work in the face of severe shortages of materials and manpower is not as strange as it may seem. Overexpenditure of materials and labor (and thus higher costs than planned), redirection of available resources into the more "profitable" type of work, and the fact that resources were not more concentrated on projects nearing completion are among the chief reasons.

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14 percent. Another cause of high costs is the frequent revision of designs and specifications for many mines, even in the finishing stages of construction, usually with sharp increases above the previously approved estimates. High construction costs continue to be a hindrance to completion of planned new capacity -- much of the shortfall in commissioning new capacity during 1957 is explained by the need for considerably greater volumes of work to be performed than envisioned in the plans. 267/

2. Prolonged Construction Periods and Misallocation of Resources.

Construction organizations in the Donbas and in the USSR at large have been criticized sharply for beginning construction of mining facilities and sinking of shafts before housing has been provided for their workers and even before the required spur tracks and access roads have been constructed. Poor organization and supervision of the construction effort also contribute to lagging construction. Mines are customarily built by several construction trusts which carry out their individual assignments of tunneling, installation, road construction, and the like, with little or no coordination of the various activities. 268/

The Sixth Five Year Plan had called for an approximate doubling of the tempo of sinking of shafts as one of the most important means for reducing the periods for construction of mines. (Sinking of shafts is said to take up roughly 70 to 80 percent of the total time required for construction of mines. 269/) Of all kinds of shaft-sinking, the sinking of vertical shafts is presently the most mechanized, yet progress has been less than satisfactory. The tempo in the sinking of vertical shafts by coal construction organizations in the USSR as a whole has been raised over the years as follows:

<u>Meters</u>		
<u>Year</u>	<u>Average Monthly Tempo</u>	<u>Maximum Monthly Tempo</u>
1951	12.5	43.3
1952	17.4	94.4
1953	18.2	100.7
1954	24.5	150.0
1955	26.7	202.1
1956	27.8	150.6
1957	30.0	241.1

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Although the average monthly tempo by 1956 was more than double that of 1951, the rate of increase has slackened noticeably since 1954. The plan for 30 meters in 1956 was not achieved. The average rates of advance in tunnel heading, in both horizontal and inclined mining, were said to be completely unsatisfactory as of the beginning of 1958. The plan for 1958 calls for further improvements in underground mining construction as one of the most important tasks for construction workers. 270/ The present average rates of advance are additional factors which continue to contribute to prolonged periods of construction.

Probably the most important reasons for excessive delays in completion of coal mines are the practices of dispersing construction resources among too many projects and of low yearly allocations of investments. In the first year of construction of many mines and pits, capital investment is provided at the rate of only 5 to 7 percent of the total estimate cost of the given projects. In the following 2 to 3 years, investment is frequently limited, and, conversely, in the year in which commissioning is planned, excessively high levels of capital investment are stipulated. Thus the assignment of investment entails overlong periods of construction and provides investment goals in the later years which construction organizations are incapable of fulfilling. Construction of coal mines, therefore, is spread over 7 to 10 years instead of 2 to 4 years.

In the construction of many mines for which the estimate costs range from 170 million to 230 million rubles, for example, the investment resources allocated yearly have been at rates which spread construction over 8 to 12 years. In these cases the funds allocated in the first 3 to 4 years scarcely furnish 8 to 10 percent of the estimate costs yearly. In recent years the allocations have been increased, but the volume of work has been increased less than planned because construction organizations did not have the necessary capacity. Thus from the start of construction of such mines to 1 January 1957, 20 to 40 percent less than the planned volume of work had been achieved.

The Sixth Five Year Plan was to provide for considerable improvement in yearly allocations of investment. Capital investment was to be planned at not less than 10 to 15 percent of the estimate cost in the first year of construction. Investment in the intermediate years was to be raised considerably and, for the years of commissioning, generally was to be planned at levels less than those in the year immediately preceding commissioning. In the majority of cases, apparently, 90 percent or more of the estimate cost of the project was to have been put in place by the beginning of the year in which the project was to be commissioned. 271/ In fact, however,

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this plan is far from having been achieved, as indicated above in the discussion of the plan for 1958.

The persistence of the dispersion of investment among too many projects and low yearly allocations of investment, uncoordinated with plans for putting productive facilities into operation, is shown in the following data on performance in construction for the Ministry of the Coal Industry during 1954-56 272/:

	<u>1954</u>	<u>1955</u>	<u>1956</u>
Construction-installation work performed			
Million rubles	9,196	9,335	10,218
Percent of plan	91.0	89.1	99.1
Capacity of mines and pits commissioned			
Percent of plan	78.2	47.0	55.7
Capital stock commissioned			
Actual (Million rubles)	11,900	10,349	11,501
Shortfall (Million rubles)	1,516	3,109	2,947
Fulfillment (Percent of plan)	88.7	76.9	79.6
Volume of unfinished construction			
As of end of respective year (Million rubles)	13,087	14,046	15,755
Increase during respective year (Million rubles)	1,180	959	1,709

If the resources which went into the increased volume of unfinished construction during 1954-56 had been concentrated instead on projects which were to have been commissioned during the period, the commissioning of capital stock would have been improved considerably, and the commissioning of new capacity would not have been so far below the plan. From all indications the volume of unfinished construction increased again during 1957 -- the plans for construction-installation and capital investment for the coal industry were fulfilled or exceeded, but the plan for commissioning new capacity was not fulfilled.

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The cumulative effects of low allocations of investment year after year have been discussed by a Soviet mining engineer, I.K. Stanchenko, in a study published in 1957. His study covers data on the planning and appropriation of investments for mining construction during the previous 8 to 9 years,\* with reference to 254 mines and pits with a total capacity for production of about 150 million tons of coal per year. His sampling covers more than 60 percent of the total new capacity to be commissioned under the Ministry of the Coal Industry under the Sixth Five Year Plan. The 254 mines and pits were divided into 5 groups, each group containing those mines and pits which were planned to be commissioned in each of the 5 years 1956-60. Construction of these projects would be prolonged because of the inadequacy of the annual capital investment and of the volume of construction-installation work which were planned. Of the 254 mines, 176, or approximately 70 percent, would be commissioned later than planned, as follows:

110 mines	1 to 2 years late
41 mines	3 to 4 years late
25 mines	5 to 7 years late

In the group of mines which were to have been commissioned during 1956, the annual allocations of investment and consequent achievements were at low levels for a number of years after the start of construction. Only in the last 3 years of construction, when the mines were entering the precommissioning stage, were the yearly allocations and performance appreciably increased. Yet the volumes of construction at these mines were still below the norms in 1954 and 1955. In fact, the norms were achieved only in 1956 (the year of commissioning), with much work still remaining to be made up from previous years.

In the first 4 years the total sum allocated for construction of a number of mines in the group to be commissioned during 1957 amounted only to the sum which should have been allocated in the first 2 years. Subsequently, from 1953 through 1956, annual allocations never achieved the volumes envisioned by the norms.

For the group of mines to be commissioned in 1958, the annual allocations per mine were also low in the early years, and,

\* The study excludes a comparatively small number of projects on which construction was prolonged extraordinarily and small mines constructed by the high-speed method in 1 to 1-1/2 years.

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although increased somewhat from 1954 on, were still far from reaching the norms. For this group of mines, the volume of construction-installation work planned in the precommissioning year of 1957 totaled about 1 billion rubles, 230 million rubles less than required by the norms. Thus the low volumes of construction put in place at the mines in this group were not expected to be overcome during 1957. Finally, the misallocations and lags in construction at the mines which were to be commissioned during 1959 and 1960 were even more noticeable. 273/

### 3. Construction Carryover and New Starts.

The above data raise the question of the appropriate steps to be taken to correct the dispersion of resources and the prolonged periods of construction. Correction may be sought (a) by appropriately increasing the total volume of construction resources allocated to mine construction or, (b) working within the given volume of resources allocated, by reducing the number of projects under construction and concentrating the released resources on the remaining projects. The choice between alternatives, however, must be governed also by the volume of construction carryover required to support the plans for putting new capacity into operation.

By the beginning of 1957 the capacity of mines and pits under construction was said to be nearly equal to that remaining to be commissioned under the draft Sixth Five Year Plan, or approximately 200 million tons.\* 274/ The crucial question at that time, therefore, concerned the approach to be taken during 1957-60. One approach perhaps is best rendered in the complaint that although 320 above-limit mines were then under construction for the Ministry of the Coal Industry (and not all of them were to be completed under the Sixth Five Year Plan), it was planned to undertake the construction of 110 new mines. Prombank also was inclined to limit severely new starts during 1957. 275/ Stanchenko, on the other hand, concluded that it was not possible to reduce the number of projects under construction if the Sixth Five Year Plan were to be fulfilled. Instead, it was necessary to start additional new mines and pits in 1957 and 1958 in order to provide the construction carryover for commissioning new capacity subsequent to 1960. 276/ The weight of the evidence seems distinctly in favor of Stanchenko's position.

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\* Stanchenko had indicated that the Ministry for Construction of Coal Industry Enterprises had approximately 180 million tons under way, or a minimum for that Ministry under the Sixth Five Year Plan. Other data justify the extension of the proportion to the plan for the Ministry of the Coal Industry as a whole.

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Aside from the evidence already cited in regard to the serious failures pending in meeting construction schedules during 1956-60, unless greatly increased allocations are made and matched by equivalent physical resources, the precariousness of the situation can be demonstrated as follows. The construction carryover as of the beginning of 1957 (in terms of annual capacity) has been estimated at approximately 200 million tons per year. New capacity under way but not completed as of the beginning of 1956 is estimated at a maximum of 100 million tons.\* Thus the net new capacity put under construction during 1956 is estimated at approximately 100 million tons. The undercutting of new starts during 1957 appears to have been considerable. Coal mines with a total capacity of 170 million tons per year were said to be under construction early in 1958. 278/ In conjunction with the new capacity of 200 million tons under way as of the beginning of 1957 and the approximately 35 million tons which were commissioned during 1957, it is implied that new projects totaling about 5 million tons of new capacity were started during the year. Several conclusions can be drawn from the above data.

Cutting back the carryover in new capacity to 170 million tons at the beginning of 1958 strongly suggests that the required buildup of carryover for 1959-60 is being seriously underestimated. Assuming that no additional new capacity is started during the remainder of 1958 and that the planned goal of commissioning new capacity totaling approximately 39 million tons is achieved, the new capacity under way by the beginning of 1959 can be estimated roughly at 130 million tons. The total commissionings required in 1959-60, if the Sixth Five Year Plan is to be fulfilled, amount to nearly 140 million tons.\*\* Moreover, the net addition of about 100 million tons of new capacity on which construction was started during 1956 means that nearly 100 million\*\*\* of the projected 130 million tons to be under way at the beginning of 1959 will have been under construction for only 2 to 3 years by that time.

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\* Under the Fourth and Fifth Five Year Plans, mines and pits totaling 286 million tons of new capacity were put under construction, whereas the commissionings during the same period totaled 214 million tons. 277/ Thus it is estimated that a minimum of 72 million tons of new capacity was carried over from the Fourth and Fifth Five Year Plans into the Sixth Five Year Plan. A generous allowance has been made for new capacity which might have been started before 1946 but had not yet been completed by the beginning of 1956.

\*\* See Table 9, p. 90, below.

\*\*\* The 6 million tons of new capacity in the form of 35 Komsomol mines begun during 1956 have been deducted.

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Therefore, the acceleration in construction required to commission the remaining 177 million tons of new capacity during 1958-60, even with no net carryover into the subsequent period, seems considerable. To provide for a reasonable carryover beyond 1960 will only increase the demand for scarce construction resources. Concentration of resources, at any rate, is not enough. Only the allocation of a much greater volume of resources can provide the solution if the goals of the Sixth Five Year Plan are to be retained.

E. Summary and Prospects.

The directives of the Soviet Sixth Five Year Plan called for commissioning new mines and pits with a total capacity of about 240 million tons, or more than was commissioned under both the Fourth and the Fifth Five Year Plans. Performance under the Fifth and the Sixth Five Year Plans, as presented in Table 9,\* was consistently below the level planned during 1954-57.\*\* Even if the plan for 1958 is achieved, only 43 percent of the goal of the Sixth Five Year Plan will have been achieved by the end of the first 3 years of the plan. Accelerated construction and commissioning of new capacity are required if the plans are to be met. Sufficient resources for the acceleration can be obtained only with a greater total quantity of construction resources -- materials, manpower, and equipment.

Resources at the disposal of organizations constructing coal facilities have been and continue to be inadequate to perform the construction programs planned. One of the results of planning construction programs which are much greater than warranted by the available resources is a large-scale dispersion of those resources among too many projects or low yearly allocations of investment resources for the individual projects or both. Because the principal handicap has been the inadequacy of construction resources, the planners must assume chief responsibility for failures to correct the dispersion of investments and to provide the resources necessary to build up the capacity of construction organizations to levels coordinate with the planned programs of construction. 280/ The problems of dispersion of investments and prolonged construction periods seem to have been clear to all concerned, but disagreement prevailed as to the proper correctives to be introduced.

\* Table 9 follows on p. 90.

\*\* Construction of coal-concentrating plants also had fallen behind through 1956-57, and it is planned to double the work on such projects in 1958 in order to overcome some of the lags. 279/



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Table 9

Commissioning of New Capacity for the Extraction of Coal  
Under the Ministry of the Coal Industry in the USSR  
Under the Fifth and Draft Sixth Five Year Plans  
1951-60

Period	Amount (Million Metric Tons)			Fulfillment of Plan (Percent)
	Plan	Actual	Shortfall	
Fifth Five Year Plan (1951-55)	132	112	20	85
1954	N.A.	N.A.	N.A.	78
1955	N.A.	N.A.	N.A.	47
1956	50	28	22	56
1957	46	35	11	76
1958	39			
Average yearly re- quirement, 1959-60	69 <u>a/</u>			
Sixth Five Year Plan (1956-60)	240			

a. The average yearly commissioning required in the last 2 years of the Sixth Five Year Plan was determined from the difference between the goal of the draft Sixth Five Year Plan and the sum of commissionings in 1956-57, assuming that the plan for 1958 is fulfilled.

Also, existence of substantial disagreement as to the volume and rate of construction required to support the goals for production of coal under the Sixth Five Year Plan was implicit in the speeches of the Minister of the Coal Industry and the Chairman of the State Economic Commission. The years since the convening of the Twentieth Party Congress have substantiated the appraisal of the Minister of the Coal Industry that a greater construction program was required, especially in the Donbas.

The relationship between failures to fulfill the goals for commissioning new capacity and the goals for production is more difficult to determine for the coal industry than for many other industries because most of the large, newly built mines are brought to their designed capacity only 5 to 6 years or more after they have been commissioned. 281/ The low increase planned in mining coal in

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the Pechora Basin under the Sixth Five Year Plan, however, reportedly resulted from lags in mining construction suffered in previous years. 282/  
The decree of October 1956 on the need for urgent acceleration of mine construction in the Ukrainian SSR, and particularly the Donbas, is further evidence that lagging construction was handicapping fulfillment of production goals in the first years of the Sixth Five Year Plan. In any case, there is little doubt that the production returns initially expected from completions under the Sixth Five Year Plan have been seriously compromised.

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V. Survey of Construction in Other Heavy Industries.

To supplement the discussion given above on Soviet construction in the construction materials, ferrous metallurgical, and coal industries, a brief survey of construction in the electric power, petroleum, nonferrous metallurgical, and chemical industries is presented in the following sections. The principal question at issue is the extent to which it might be feasible to free construction resources from employment in the latter industries, or cut back on previously envisioned increased allocations, in order to redirect the released resources into construction for the construction materials, ferrous metallurgical, and coal industries.

A. Electric Power Industry.

Under the Soviet Fifth Five Year Plan (1951-55), generating capacity totaling 17.6 million kilowatts (kw) net\* was commissioned at electric power stations in the USSR, more than double the 8.4 million kw commissioned under the Fourth Five Year Plan (1946-50). 283/ The Fifth Five Year Plan had called for an approximate doubling of the capacity of electric power stations, including a trebling of the capacity of hydroelectric power stations.\*\* Expansion of established thermal electric power stations was to provide for most of the planned increase in thermal electric generating capacity. 285/

For the Ministry of Electric Power Stations, however, the Fifth Five Year Plan of construction-installation work was fulfilled by 88 percent, and the plan for commissioning new capacity for electric power was fulfilled by 84 percent.\*\*\* 287/ Therefore, a total capacity of about 11.5 million kw of a planned 13.7 million kw was commissioned during 1951-55, or a shortfall of 2.2 million kw in the Ministry. Because the shortfall in commissioning hydroelectric generating capacity is estimated to have been approximately 2.8 million kw, or an underfulfillment of 52 percent, underfulfillment of the Ministry's plan for commissioning new capacity for electric power as a whole was more than accounted for by the shortfall in commissioning

\* The capacity of electric power stations was raised 17.6 million kw under the Fifth Five Year Plan. 284/ The total of 17.6 million kw commissioned is a net increase which excludes the kilowatt capacity replaced or retired.

\*\* It is undetermined whether these multiples referred to all electric power stations or only to those under the Ministry of Electric Power Stations.

\*\*\* Under the Fifth Five Year Plan the Ministry of Electric Power Stations administered stations with generating capacities totaling 60 to 62 percent of the capacity of all electric power stations in the USSR and 84 to 88 percent of all hydroelectric power stations. 286/

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of hydroelectric generating capacity.\* It can be assumed, therefore, that the Fifth Five Year Plan for commissioning thermal electric generating capacity was exceeded.

Much of the generally favorable performance in construction of thermal electric power stations during 1951-55 probably resulted from the primary emphasis on expansion of established stations, in contrast with the concerted emphasis on completion of new hydroelectric power projects, and from increased use of standard designs in construction of large, regional thermal electric power stations. Under the Fifth Five Year Plan, 24 hydroelectric power stations were commissioned.\*\* When all units were installed, these stations were designed to have a total capacity of more than 5 million kw. By the end of the Fifth Five Year Plan, only about half of the indicated total capacity had been put into operation at these projects. 289/

1. Draft Sixth Five Year Plan (1956-60) and Long-Term Development.

Capital investment in electric power stations and networks was to be increased approximately 90 percent under the draft Sixth Five Year Plan (1956-60) in comparison with that achieved under the Fifth Five Year Plan. 290/ The generating capacity of electric power stations was to be increased by about 38 million kw (excluding atomic electric power), of which 27 million kw were to be in thermal electric power stations and 11 million kw in hydroelectric power stations. In 1960, total generating capacity in thermal electric and hydroelectric power stations was to be 2.03 times that of 1955. The total generating

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\* These estimates were made from data on the capacity of electric power stations of the Ministry, including hydroelectric power stations, during 1951-55. Capacity in 1950 was estimated by assuming that the Ministry administered 60 percent of all electric power capacity in the USSR and 85 percent of all hydroelectric power capacity. The Fifth Five Year Plan for hydroelectric power capacity under the Ministry was estimated by assuming that the goal of trebling the capacity of 1950 applied to the Ministry. If the approximate doubling of electric power capacity and trebling of hydroelectric power capacity called for by the Fifth Five Year Plan is assumed to apply to the entire USSR rather than to the Ministry alone, the conclusion is unchanged -- the shortfall in commissioning hydroelectric power capacity more than accounted for the shortfall in total electric power capacity during 1951-55. In either case, the conclusion seems to have been corroborated by the statement on the results of the Fifth Five Year Plan, which noted that the task for commissioning total electric power capacity was underfulfilled because of lagging construction of hydroelectric power stations. 288/

\*\* That is, at least the first aggregates (an aggregate consists of a turbine and a generator) of the given projects were commissioned.

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capacity of thermal electric power stations was to be 1.89 times that of 1955 and that of hydroelectric power stations 2.7 times.\* 293/

The draft Sixth Five Year Plan called for completion of all aggregates of the hydroelectric power station (GES\*\*) at Kuybyshev and the one at Stalingrad, as well as the installation at Votkinsk with a capacity of 540,000 kw. The Kremenchug GES (450,000 kw, later raised to 675,000 kw) and the Dneprodzerzhinsk GES (250,000 kw) were to be constructed and put into operation. Construction was to be started on the Kama GES on the Lower Kama River (about 900,000 kw), the Cheboksary GES on the Volga (800,000 kw), and the Saratov GES on the Volga (about 1 million kw). Large hydroelectric power stations were to be built in the eastern regions of the USSR. The Irkutsk GES with a capacity of 660,000 kw and the Novosibirsk GES with a capacity of 400,000 kw were to be commissioned. The first section was to be commissioned at the Bratsk GES (full capacity of 3.2 million kw, later raised to 3.6 million kw). Construction was to be started on the Krasnoyarsk GES (3.2 million kw, later raised to 4 million kw) and the Kamensk GES (500,000 kw). 294/

The Sixth Five Year Plan emphasized construction of large thermal electric power stations with power units of 100,000 to 150,000 kw, 200,000 kw, and even 300,000 kw, in contrast with the smaller units installed in previous years. 295/ A total of 10 thermal electric power stations with a capacity of 1 million to 1.2 million kw each are being constructed. 296/

Preliminary plans for construction of electric power stations over a longer period of time have been stated. In conjunction with the production of electric power projected for 1972, commissioning of new capacity in thermal electric power should total 8 million to 9 million kw per year during the period 1961-65. Another source stated that by 1965 total installed capacity of electric power stations is to be 2.2 times that of 1957. The source also stated that total installed capacity of thermal electric power stations is to be 2.1 times, and of hydroelectric power stations to be 3.9 times, that of 1957.\*\*\* 297/

\* One source stated that total generating capacity was to be 2.2 times that of 1955, 291/ and another indicated that thermal electric power capacity was to be 2.2 times, and hydroelectric power capacity 2.7 times, that of 1955. 292/ These references may well have been only to stations under the direction of the Ministry of Electric Power Stations.

\*\* Gidroelektricheskaya stantsiya -- hydroelectric power station.

\*\*\* The discrepancies in these long-term plans are explored on p. 101, below.

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2. Construction and Commissioning, 1951-58.

Annual commissioning of new generating capacity in electric power stations of the USSR, including hydroelectric power stations, has been as follows\*:

<u>Year</u>	<u>Million Kilowatts</u>	
	<u>All Electric Power</u>	<u>Hydroelectric Power</u>
1951	2.5	0.1
1952	3.1	0.5
1953	3.4	0.7
1954	4.2	0.6
1955	4.4	0.9
1956	5.6	2.4
1957	5.0	1.5
1958 plan	5.6	0.6

In 1956, the first year of the Sixth Five Year Plan, more than 50 hydroelectric power stations were under construction. Five of these stations, including those at Saratov and at Dneprodzerzhinsk, had been started in 1956. 300/ Installation of aggregates was heavily emphasized, with the result that the plan for commissioning new capacity in hydroelectric power plants was exceeded, although only slightly. 301/ Even so, the 2.4 million kw commissioned in hydroelectric power stations were less than the estimated shortfall in commissionings of 2.8 million kw for the Ministry of Electric Power Stations under the Fifth Five Year Plan.

The large volume of unfinished construction and dispersion of investment resources among too many construction projects received much criticism in the latter half of 1956. A general policy of concentrating resources on the most important projects and on those nearing completion was stipulated in the national economic plan for 1957. This policy of concentration of resources was also applied to construction of electric power stations, in spite of the heavy concentration on installations during 1956. The Ministry of Electric

\* Data for 1951-56 are derived from source 298/, which gives the total generating capacity of stations for the individual years. As noted above, the sum of the annual increases coincides with the reported commissioning of electric power capacity totaling 17.6 million kw during 1951-55. For 1956, it is assumed that the increase in capacity does not understate the actual commissionings -- that is, that retirement of capacity in 1956 was again insignificant. Data on 1957 and the plan for 1958 are from source 299/.

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Power Stations planned to channel approximately 60 percent of its capital investment during 1957 into completion of projects already in partial operation. The Ministry was not to begin construction of any new stations except the Yerevan GES. 302/ Even so, total commissionings dropped to almost 5 million kw in 1957, with an even greater drop in commissioning capacity at hydroelectric power stations.

The policy of concentrating resources on completing electric power projects during both 1956 and 1957 probably accounts for much of the cutback in commissionings of hydroelectric capacity which is planned for 1958 and suggests that the plan for commissioning a total of 5.6 million kw of new capacity in electric power as a whole may not be fulfilled in 1958. From 1954 on, however, commissionings of thermal electric generating capacity apparently have been fairly constant at a little more than 3 million kw per year, and it may be possible to raise this figure sufficiently to meet the goal for total commissionings in electric power in 1958. The plan to start construction on 5 new, large thermal electric power stations during 1958 probably indicates some renewed emphasis on building up construction carryover in electric power projects. 303/

3. Problems in Construction.

The principal problems in construction of electric power stations are similar to those in construction for other heavy industries. Construction costs have been higher than planned and the periods of construction prolonged, primarily because of dispersion of financial and physical resources among too many projects, low yearly allocations of investment to given projects, and inadequate capacities of construction organizations. Other important handicaps to efficient organization of the construction effort are late deliveries of designs and specifications and insufficient utilization of skilled construction workers. Probably less important are shortages of some types of construction equipment and spare parts, the dragging out of finishing work after the basic projects have been put into operation, and the delivery of misfitting production equipment which complicates the installation process.

Although costs of constructing thermal and hydroelectric power stations probably are still higher than planned, considerable progress in reduction of costs was made during 1951-57. Costs of construction-installation apparently have been reduced with greater success in construction of thermal electric power stations than in hydroelectric power projects.\* In 1955, costs in construction of

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\* This conclusion is based on a comparison of changes in costs of construction-installation from 1950 to [footnote continued on p. 98]

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hydroelectric power stations were 5 percent greater than planned, with more than 90 percent of the excess encountered at 8 of the largest projects. More than 9 billion rubles in excess of plans had been spent at 6 hydroelectric power stations which were still under construction in 1955. High costs of construction materials play a large part in the high costs of constructing hydroelectric power stations, mostly as a result of the high costs of materials produced on site.\* Overexpenditure of building materials is also an important factor -- total input of cement in construction of hydroelectric power stations during 1956 was 10 to 15 percent greater than called for by the norms. Overexpenditure of wages, on the other hand, has been a much less important contributor to high construction costs. In general, construction of hydroelectric power stations has been planned at a volume considerably greater than warranted by the available construction resources, resulting in high construction costs and prolonged periods of construction. 304/

Norms for the duration of construction of thermal electric power stations with installed capacities from 300,000 to 600,000 kw have been established at 41 to 43 months for commissioning of the first aggregate, and 55 to 60 months for commissioning at full capacity. In recent years, several large thermal electric power stations were completed in periods within the norms, but construction periods of most stations evidently have exceeded the norms.

Of 60 months required for construction of a thermal electric power station with a capacity of 600,000 kw, the preparatory stage of construction usually takes 20 to 22 months; the basic stage, 23 to 25 months; and the finishing stage, 15 months.\*\* In the US, on the

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1957 in the Main Administration of Construction and Installation of Thermal Electric Power Stations in the Central and South Regions with those in the Ministry of Construction of Electric Power Stations.

\* The need for constructing more enterprises to produce building materials on site than is economically justified is adequate testimony to the existence of shortages or interrupted supplies of such materials or both.

\*\* The preparatory stage involves the construction of housing and enterprises to produce materials on site, the laying of railroads and access roads, and the installation of power and water supply systems for construction organizations; the basic stage involves the construction of the entire complex of industrial facilities necessary for putting the first aggregates into operation and the construction of the housing required for station personnel; the finishing stage involves commissioning the remaining aggregates and housing, cultural and educational and industrial facilities.



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other hand, the preparatory stage requires only 3 to 4 months. Because the time required for the basic stage in both countries is approximately the same, the primary means to a considerable reduction of the duration of construction in the USSR is a reduction of the duration of the preparatory stage.

Another important factor in prolonged periods of construction and high costs of thermal electric power stations is said to be the practice of designing stations in sections. Inadequate long-term planning results in stretching out construction of power stations into 4 and 5 uncoordinated increments covering a total of 10 to 12 years rather than phasing the entire project. Construction work is inefficiently organized, and labor and equipment are poorly utilized. 305/

Periods of construction of hydroelectric power stations have been prolonged unduly. Norms for construction of small- and medium-size hydroelectric power stations with capacities up to 200,000 kw have been established at 2-1/2 to 3 years, and for large stations of more than 200,000 kw, 5 years. Although a number of stations were built within the norms under the Fifth Five Year Plan, the pattern has been largely one of protracted periods of construction. 306/ After 7 years of construction the first aggregate of the Pavlovsk GES had not yet been commissioned, and the first aggregates at the Gor'kiy GES were commissioned only in the ninth year of construction. 307/ The first aggregates of the Novosibirsk GES were commissioned in 1957, after about 6 years of construction. 308/ The first aggregate at the Stalingrad GES will be commissioned by the end of 1958 or the beginning of 1959, after about 8 years of construction. 309/ Even the relatively favorable performance in construction and commissioning of the first section of the Kuybyshev GES was qualified by considerable lags in construction of several of its ancillary structures. 310/

A disruptive pattern in the use of teams of skilled construction workers still persists in construction of both thermal electric and hydroelectric power stations. After completion of specified stations or sections, teams of experienced workers frequently are disbanded rather than transferred to other electric power projects. The process of assembling working teams of skilled personnel is needlessly handicapped because of the absence of long-term plans which coordinate construction schedules with anticipated releases of construction teams. 311/

A practice which contributes to the inefficient utilization of construction resources, especially in construction of hydroelectric power stations, is that of prolonging the finishing stage of construction for years after the last aggregate has been commissioned.

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Construction organizations have been responsible for such delays because of their reluctance to perform jobs which remain after the formal commissioning of new capacity, but financial organizations also have been at fault for their failures to allocate sufficient funds for completing the remaining work with dispatch. 312/

4. Prospects.

The lags in construction of facilities to produce electric power have been and apparently will continue to be less urgent than those in the construction materials, ferrous metallurgical, and coal industries when measured against the estimated needs for electric power. Commissioning of capacity to produce electric power under the draft Sixth Five Year Plan as such, however, probably will fall short of the goals. The record in commissioning new capacity during 1956-57 and the requirements to fulfill the Sixth Five Year Plan are approximately as follows:

	<u>Million Kilowatts</u>		
	<u>Thermal Electric*</u>	<u>Hydro- electric</u>	<u>Total</u>
1956	3.2	2.4	5.6
1957	3.5	1.5	5.0
1958 Plan	5.0	0.6	5.6
Average annual re- quirement, 1959-60**	7.6	3.2	10.9
Sixth Five Year Plan***	<u>27</u>	<u>11</u>	<u>38</u>

There would seem to be little chance of fulfilling the Sixth Five Year Plan for commissioning new capacity in electric power stations unless the volume of resources directed into construction of electric power facilities is increased very considerably during 1958-60. Fulfillment of the plan for 1958 will require a greater volume of construction resources. Fulfillment of the Sixth Five Year Plan would seem to be less urgent at this time because of the reduced need to serve industrial facilities, the construction of which also is lagging.

\* Derived as the residual figure from data on capacity of hydro-electric power stations and total commissionings, so that the estimated commissionings of thermal electric generating capacity are maximum estimates.

\*\* Assuming fulfillment of the plan for 1958.

\*\*\* The total figures for the data on the Sixth Five Year Plan have been rounded to the nearest million kilowatts.

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The question then is raised of present plans for construction in the electric power industry.

As indicated above, some authorities in the USSR have stated that 8 million to 9 million kw of new capacity for thermal electric power should be commissioned yearly during 1961-65 to achieve the output of electric power projected for 1972. Plans call for building a greater number of large thermal electric power stations (with capacities of 1 million to 2 million kw and larger and power units of 150,000 to 200,000 kw and larger), which would permit a reduction in the volume of construction-installation work required per kilowatt of new capacity on the order of 15 percent. 313/ Such a construction program in thermal electric power stations, however, also would require a greater volume of construction resources than has been allocated in the past.

Another statement of long-term plans for the electric power industry indicated that in 1965 total installed generating capacity of electric power stations was to be 2.2 times that of 1957: specifically, capacity of thermal electric power stations was to be 2.1 times and that of hydroelectric power stations was to be 3.9 times their respective capacities in 1957.\* Such a plan implies a construction program for thermal electric power stations considerably less strenuous in the years after 1958 than that implied by the goal of commissioning 8 million to 9 million kw annually in 1961-65\*\* and thus would seem to require at most only modest increases in the construction program.

Increasing the capacity of hydroelectric power stations in 1965 to 2.9 times that of 1957, on the other hand, would be a considerable task and implies a total increase in capacity of approximately

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\* The multiple of 3.9 times in hydroelectric generating capacity is inconsistent with the other data and appears to be more correctly stated as 2.9 times rather than 3.9.

\*\* Two discrepancies appear in the respective announcements. First, multiplication of estimated installed capacity of thermal electric power stations as of 1957 by 2.1 yields a total planned increase in new capacity of 42 million kw over the 8-year period in contrast with the annual average of 8 million to 9 million kw elsewhere stated as planned for the 5-year period, 1961-65. Second, the total increase in new capacity planned in hydroelectric power stations, derived in like manner and added to the increase of 42 million kw planned for thermal electric power stations, yields a total planned increase in electric power capacity which is about 14 million kw greater than that indicated if the total capacity as of 1957 is multiplied by 2.2. In this latter respect, see the footnote above.

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19 million kw during 1958-65. An average annual commissioning of about 2.4 million kw would be required. In contrast with the 1.5 million kw commissioned during 1957 and the 0.6 million kw planned for 1958, a considerable increase in construction resources for hydroelectric power stations would be required. Moreover, total costs of construction per kilowatt of capacity are greater for hydroelectric power stations than for thermal electric power stations. Therefore, the total drain on construction resources would be considerably greater than that seemingly implied by the smaller share of hydroelectric power in the total capacity of electric power stations.

In accounting for feasible reductions in costs and increases in the productivity of labor in construction, the conclusion seems warranted that greater volumes of resources for construction of electric power facilities are required over the next several years if such long-term plans are to be met.

In his speech delivered at the opening of the Kuybyshev GES in August 1958, Khrushchev stated that it was necessary to give relatively greater priority to construction of thermal electric power stations than to hydroelectric power stations. Although the costs of operating hydroelectric power stations are lower than for thermal electric power stations (other things being equal), the cost of constructing hydroelectric power stations is greater and the time required for construction is longer. With the same outlay of investment, therefore, commissioning of new capacity in electric power can be greater and can be achieved in a shorter period of time if construction of thermal electric power stations is given greater priority. Khrushchev indicated that this reassessment of the most rational pattern for allocation of resources for constructing new capacity to produce electric power was necessitated by the need for greater investments in other branches of heavy industry. It was not clear from his speech whether the new policy amounted to one in which some amount of the investment resources previously earmarked for development of electric power would be saved and diverted into construction for other branches of heavy industry or one in which the amount of investment resources previously earmarked for development of electric power would remain unchanged but which a greater proportion would be directed into construction of thermal electric power stations. It is doubtful (other things being equal) that either alternative would ease substantially the burden already placed on the scarce supply of investment resources by the lags in construction of electric power stations or would enable fulfillment of the goals for commissioning new capacity in electric power under the draft Sixth Five Year Plan.

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B. Petroleum Industry.\*

1. Fifth and Draft Sixth Five Year Plans, 1951-60.

The draft Sixth Five Year Plan called for construction and commissioning of refineries and installations with a total capacity for primary distillation of at least 45 million tons of crude petroleum and for cracking at least 26 million tons.\*\* The capacity to handle such tonnage was said to be approximately double that commissioned under the Fifth Five Year Plan, when the capacity for primary distillation had been raised 62 percent and that for thermal cracking, 72 percent.

The volume of work performed by construction-installation organizations in the petroleum industry was 2.6 times greater in 1955 than in 1950. Statements on the draft Sixth Five Year Plan have indicated that the volume of construction-installation work performed by the Ministry for Construction of Petroleum Industry Enterprises was to be raised to 11.8 billion rubles in 1960, or to 2.3 to 2.4 times the volume performed in 1955. The Ministry performed about 5.1 billion rubles of construction-installation work in 1955. The volume of work to be put in place under the Sixth Five Year Plan was to be raised yearly by an average of 1.3 billion rubles. (The Ministry performed 6 billion rubles of construction-installation during 1956, an increase of about 0.9 billion rubles from 1955.) 314/

The volume of construction-installation work performed in the petroleum industry under the Fifth Five Year Plan was 2.5 times that performed under the Fourth Five Year Plan (with the work in refineries being 4 times that performed under the Fourth Five Year Plan). Preliminary estimates for the Sixth Five Year Plan indicated that the volume planned was to be nearly 1.78 times that performed under the Fifth Five Year Plan. 315/

Although the volume of construction-installation work was increased considerably under the Fifth Five Year Plan, the volume planned was underfulfilled by 12 percent. In addition, the plan for commissioning capacity for primary distillation was underfulfilled by 33 percent and that for cracking capacity apparently by an even greater extent. 316/

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\* This survey is pointed primarily to the construction of refineries rather than to construction problems in the petroleum industry as a whole.

\*\* Strictly speaking, the goal of 26 million tons includes all forms of refining conversion.

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2. Malpractices in Planning Construction of Refineries.

In the years after World War II, construction of new refineries was intensified. Capital investment in reconstruction and expansion of established refineries and construction of new refineries was increased steadily up to 1954. In conjunction with the reduction of capital investment in construction of refineries during 1954-55 and the prolonged periods of construction, a gap arose between the quantity of petroleum extracted and the capacity for refining it.\* This gap has not yet been overcome. 317/

Approximately 2 billion rubles have been allocated yearly for construction of new refineries, but these investments have been distributed ineptly. The former Ministry of the Petroleum Industry in the USSR began construction of 3 large refineries in 1951, 2 of which were at Novo-Gor'kiy and at Perm'. After 7-1/2 years, only 20 to 30 percent of the estimate costs of the projects have been fulfilled.\*\* In 1952, construction was started on another refinery at Ryazan'; in 1953, on refineries at Yaroslavl' and at Novo-Ishimbay; and in 1954, on the refinery at Irkutsk. In order to begin construction of the Irkutsk refinery, 20 million rubles were diverted from other construction jobs in 1954 (with the approval of Gosplan), but only a little more than 1 million rubles actually was invested in 1954. In fact, during the 4 years 1954-57, work amounting to only 9 percent of the estimate cost of the refinery was completed. Even in 1958 the construction organization which is building the Irkutsk refinery is not prepared to carry on much work. As a result of the low yearly allocations and dispersion of investments, not one of the above-mentioned seven refineries had been commissioned by the beginning of 1958. 319/

The prolonged periods of construction of refineries are illustrated by the Fergana refinery, construction of which began in 1949. Now in its tenth year of construction, the first section is planned to be put into operation in the fourth quarter of 1958. On the other hand, when material and financial resources were concentrated properly, refineries have been built within the established norms for the duration of construction. For example, the first section of the Omsk refinery was commissioned within the period established by the construction schedule. An average of 270 million rubles

\* From all indications, the gap is not a matter of a total refining capacity which is inadequate to refine all the petroleum extracted, but rather a matter of having a total refining capacity which is less than that required for the most efficient refining of the petroleum extracted.

\*\* Another source stated that after 7 years of construction only 52 percent of the estimate costs of 5 refineries had been allocated. 318/

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of investments were allocated annually, and the refinery, with a capacity of several million tons of refined petroleum, was completed in its entirety and commissioned in 6 years. 320/

The practice of dispersing investment among too many projects, which leads to prolonged periods of construction, apparently has not been corrected in the plan for 1958. Capital investment in the petroleum and gas industries is to be increased by 4 billion rubles (0.7 billion of the increase was for the gas industry), or 30.5 percent above that of 1957. More than 10 large refineries were under construction at the beginning of 1958. New capacity is to be commissioned at refineries at Gor'kiy, Stalingrad, Perm', and Fergana. The plan nevertheless provides that construction of three more large refineries is to be started during 1958. Moreover, the investment allocated for starting construction was less than 1 percent of the estimate cost of each of the projects, in spite of the established norm calling for 15 percent to be allocated in the first year of construction. 321/

3. Prospects.

The considerable lags in construction of refineries encountered under the Fifth Five Year Plan continued through 1956 and 1957. In spite of the fact that, with very little investment, capacity for primary distillation and cracking was increased at established enterprises during 1957, the plan for commissioning capacity for refining petroleum was not fulfilled. 322/

The basic solution for eliminating the gap between the quantity of petroleum extracted and the capacity for refining it is acceleration in the rate of construction of new refining capacities. In attempting to achieve this solution at minimum cost, a great deal of emphasis in recent years has been placed on revisions in designs of refineries so as to accommodate new equipment and technologies, reduce costs and periods of construction, and at the same time raise the capacity of refineries being built. As a result of revisions of designs of 7 refineries, the estimated capital investment per ton of refined product was reduced 22 percent at the same time that the total capacity of the enterprises was raised 50 percent. At 4 other plants for which designed capacities were not changed, capital investment estimated to be required in their construction was reduced by more than 1 billion rubles. 323/

Similarly, much attention has been accorded the solution of constructing very large refineries and reducing the periods of construction. The Sixth Five Year Plan contained the general directive that, in order to fulfill the plan for constructing new capacity

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in petroleum refining, it was necessary to reduce the periods of construction of refineries to not more than 3 years, in contrast with the 5 or more years previously required. Refinery units, previously built with a throughput capacity of 500,000 to 1 million tons per year, were to be built in consolidated units with a capacity between 2 million and 3 million tons per year. 324/ It is now said to be expedient to design and build in the next 2 to 3 years refineries with a capacity of 6 million tons per year. In addition, design institutes claim to have shown that the cost of construction per ton of refined petroleum can be reduced 14 percent if the capacity of the refinery is increased from 6 million tons to 12 million tons. 325/

The norms for duration of construction of refineries with a capacity of 6 million tons (established in 1956) are said to be too long. The first section, with a capacity of 2 million tons per year, is planned for commissioning only after 5-1/2 years, with another 2 years allowed for commissioning the remaining 4 million tons of capacity. From the start of construction to the completion of all units, therefore, the norms envision a construction period extending through 7-1/2 years. Experience has shown that a refinery with a capacity of 6 million tons can and should be constructed in 3 to 4 years, but to achieve this goal it is necessary to change the existing procedure for financing construction, build up the construction bases of construction organizations, and reorganize the base for equipment and supply. 326/

In spite of savings anticipated from changes in designs, reductions in cost, reductions in the period of construction, and refineries with larger capacities, the lags in construction suffered so far seem to warrant the conclusion that greater volumes of construction resources will be required by the petroleum industry in the coming years -- certainly in 1958. The minimum goals for new capacity for refining petroleum stated in the draft Sixth Five Year Plan apparently are still in effect, and longer term plans call for even greater construction programs. 327/

C. Nonferrous Metallurgical Industry.

The draft Sixth Five Year Plan stipulated that the volume of state capital investment in the nonferrous metallurgical industry during 1956-60 was to be increased 130 percent above the volume of investment made during 1951-55. 328/ A general idea of the importance of meeting the goals of the Sixth Five Year Plan for constructing and commissioning productive facilities in the nonferrous metallurgical industry is given by the following data on the draft plan 329/:



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Product	Planned Increase in Production, 1960, Compared with 1955	Planned Increase in Production Capacity, 1960, Compared with 1955	Percent
			Share of Planned Increase in Pro- duction from Facilities to Be Commissioned Dur- ing 1956-60
Refined copper	60	50	58
Zinc	77	80	53
Lead	42	54	66
Aluminum	110	170	80
Nickel	64	70	40

Construction and commissioning of enterprises in the nonferrous metallurgical industry in the eastern regions of the USSR were to aid greatly in meeting the plans for increasing production capacity during 1956-60. 330/ Difficulties in such construction were forecast by the fact that the directives of the Fifth Five Year Plan calling for establishment of large construction organizations and bases for producing construction materials in the eastern areas of the USSR were not fulfilled by the Ministry for Construction of Metallurgical and Chemical Industry Enterprises. 331/

In the USSR as a whole the annual plans for commissioning production capacity in nonferrous metallurgy were not fulfilled in 1954, 1955, and 1956 and probably not in 1957 (although the plan for commissioning facilities to produce aluminum was fulfilled in 1957). 332/ Various reports indicate that annual plans for construction-installation work in the nonferrous metallurgical industry also have been underfulfilled, frequently by 20 to 30 percent. 333/

Lags have been reported in construction of important productive facilities in the copper and aluminum industries, mining of bauxite, mining and processing of lead and zinc, and mining of sulfur, particularly up to the end of 1956. The basic reason for the repeated failures to meet construction schedules and to fulfill construction programs is that construction organizations building for the nonferrous metallurgical industry have not had the capacity and have not been allocated sufficient resources to fulfill the plans. Construction workers, especially skilled workers, have been in short supply. Building materials produced off site have been allocated in insufficient quantities, and subsidiary enterprises producing materials on site have been developed inadequately by construction organizations. These basic problems have been complicated further by

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tardy delivery of designs and specifications for projects to be started or already under construction, low yearly allocations of investment, dispersion of investment among too many projects, and the consequent increasing volume of unfinished construction 334/

The report on the national economic plan for 1957 stated that expansion of facilities for nonferrous mining and concentrating has lagged behind the development of plants producing metals, thereby handicapping the development of a number of branches of nonferrous metallurgy, particularly the copper, lead, and zinc industries. 335/ Judging from the plan for construction in the nonferrous metallurgical industry for 1958, it is doubtful that the gap between capacity for mining and concentrating ore and capacity for producing metals was overcome during 1957. 336/ Furthermore, it is doubtful that the lags in construction of facilities for smelting and refining in the nonferrous metallurgical industry were overcome during 1957.

The plan for 1958 called for a sharp increase in capital investment in the nonferrous metallurgical industry. 337/ In the absence of a sharp cutback in the construction program, therefore, greater volumes of construction resources will be required in this industry in subsequent years, entailing greater pressure on the volume of resources available.

#### D. Chemical Industry.

As in the nonferrous metallurgical industry, the annual plans for commissioning production capacity in the chemical industry were not fulfilled in 1954, 1955, and 1956 and almost certainly not in 1957 (although the plan for commissioning facilities for producing synthetic rubber was fulfilled in 1957). 338/ Reports on lags in construction and prolonged delays in commissioning many important projects give additional support to indications that the shortfalls in commissionings were substantial through 1957. 339/

The basic cause of failures to fulfill plans for construction work and to meet construction schedules for the chemical industry was the failure to allocate sufficient investment resources. Allocations of capital investment were not related to the periods established for constructing and commissioning chemical enterprises, and frequently even the small investment assignments were not fulfilled. For example, expansion of the Nizhniy Tagil plastics plant was started in 1951. During 1951-57 the total investment allocated amounted to only 44 percent of the estimate cost of the project, and the capital construction completed amounted to only 34 percent. In the expansion of the Sverdlovsk Plastics Plant, begun in 1955, allocation of investment during 3 years amounted to only 13.5 percent of the estimate cost, and the capital construction completed amounted to only 6.7 percent.

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Shortages and tardy deliveries of machinery for the chemical industry have also contributed to protracted construction work. As a result of such problems, construction of plants and shops in the chemical industry stretched out to 8 to 10 years instead of the intended 2 to 3 years. 340/

The draft Sixth Five Year Plan stipulated that capital investment in the chemical industry was to be increased 150 percent above the level of the Fifth Five Year Plan. 341/ The high priority for construction of chemical plants was reemphasized in the announcement of the preliminary plan for development of the industry during 1958-65. The announcement stated that more than 100 billion rubles of capital investment were to be allocated for construction and expansion of chemical enterprises and enterprises producing equipment for the industry. 342/

Capital investment in the chemical industry is to be accelerated sharply in 1958. The initial statement of the plan for 1958 indicated that investment was to total approximately 7.2 billion rubles, an increase of 53.6 percent above the level of investment anticipated for 1957. The volume of work on construction\* of plastics enterprises was to be increased 150 percent; of synthetic fiber plants, 75 percent; and of synthetic rubber plants, 48 percent. 343/

In his report calling for accelerated development of the chemical industry, Khrushchev stated that capital investment in 1958 was to be increased 68 percent above the volume actually fulfilled during 1957. 344/ The difference between the planned increases of 53.6 percent and 68 percent could be the result of an upward revision of the initial plan for 1958 or of some underfulfillment of the investment plan for 1957 or of both. In any case, the plan for 1958 will require strenuous efforts if it is to be fulfilled.

During the previous 5 years the average annual increase in capital investment in the chemical industry did not exceed 22 percent. 345/ The increases planned for 1958 and subsequent years require the transfer of large construction organizations to building for the chemical industry, the development of productive bases of the construction organizations, the creation of new construction organizations and the staffing of these new organizations with skilled construction workers, and more construction equipment and transport facilities. 346/ A much greater volume of construction resources is required for development planned in the chemical industry than was employed in building for it in the past.

\* This probably refers to capital investment rather than only to construction-installation work.

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Serious difficulties in construction have persisted in spite of the higher priority assigned the chemical industry. Construction is lagging at many projects, including some which are to be commissioned during 1958. Several councils of national economy, ministries, departments, and construction organizations are reported to have reduced the investment assignments for projects of the chemical industry and diverted the funds to other uses. Accelerated development is also being held back by an apparent incapacity on the part of construction ministries and organizations to match the funds allocated with the physical resources required. 347/

E. Machine Building Industry.

Data on construction for the machine building industry are much less extensive than might be expected from the fact that machine building has one of the largest investment programs in heavy industry. The information available, however, indicates that the problems and difficulties experienced are much the same as those in construction for the other heavy industries. Plans for construction-installation work were not fulfilled and construction periods were prolonged because of inadequate construction resources, low allocations of investment, and dispersion of investments among too many projects. Tardy deliveries of designs and specifications and subsequent revisions also prevented meeting construction schedules.

The volume of construction-installation work performed during 1951-55 fell short of the plan. The former Ministry of Construction, USSR, fulfilled its assignment under the Fifth Five Year Plan for construction-installation work on projects of the former Ministry of Machine Building and Instruments Industry by only 86.3 percent; the former Ministry for Construction of Metallurgical and Chemical Industry Enterprises, by 80.4 percent; and the former Ministry of Urban and Rural Construction, by 65.6 percent.\* 348/

Reports on numerous construction projects indicate considerable lags in construction under the Fifth Five Year Plan. For example, the Tashkent and the Uzbek agricultural machinery plants -- under construction since 1948 and 1953, respectively -- were only 65 percent completed in terms of the combined estimate costs as of early 1956. 349/ Also in 1956, at the end of about 8 years of construction, a diesel plant near Troitsk was less than one-third completed. 350/ After 8 years

\* These shortfalls by the construction ministries were said to be equivalent to the cost of constructing 6 to 8 machine building plants which would have yielded a gross output of more than 1 billion rubles per year.

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of construction, from 1950 to 1957, 4 machine building plants in Ivanovo were approximately 30 percent completed. 351/ Available data indicate that, under the Fifth Five Year Plan, construction lagged at plants producing press and forging equipment 352/ and at several other machine building plants. 353/

The prevalence of prolonged periods of construction and dispersion of investments in machine building can be judged from the following situations. At 57 machine building and instruments plants which had been under construction or reconstruction for a number of years, investment amounting to only 46 percent of the total estimate costs had been made (presumably, up to the beginning of 1957). At the plants of the electrical industry which were under construction as of 1 January 1956, investment amounting to only 54 percent of the total estimate costs had been made (presumably, up to the beginning of 1957). In spite of these relatively low levels of completed work, the Ministry of Machine Building and Instruments Industry and the Ministry of the Electrotechnical Industry had proposed to start construction of many new plants in 1957 before providing for completion of work on others started earlier. Such plans were criticized as needless dispersion of investment and as contrary to the policy of concentrating resources. 354

In addition to these factors, there are other indications that the difficulties in construction suffered under the Fifth Five Year Plan continued during 1956 and 1957 and into 1958. Construction reportedly lagged considerably during 1957 at many important projects of the machine building industry. 355/ For example, the revised target date for completion of the South Urals armature plant -- the third quarter of 1957 -- could not be met, because installation of equipment was held up by unfinished construction of the foundations for the equipment. Earlier the plant had been scheduled for completion in 1956. 356/ Construction of the Pavlodar combine plant also was behind schedule; only 60 percent of the plan for 1957 for construction-installation work on ancillary facilities and the construction base had been fulfilled. 357/ Finally, there have been indications that dispersion of investments among too many projects in the machine building industry was being continued in 1958. 358/

In view of the above-mentioned difficulties, it is doubtful that the situation in construction for the machine building industry was significantly better than that in construction for other heavy industries during 1956 and 1957. From all indications, construction resources have continued to be inadequate to meet construction schedules.

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F. Summary.

The above survey indicates that construction for the electric power, petroleum, nonferrous metallurgical, chemical, and machine building industries suffered from much the same pattern of problems as construction in the ferrous metallurgical, coal, cement, and pre-cast reinforced concrete industries. The basic problem has been that construction programs planned have been too large for the available construction resources, with the result that planned volumes of work are not fulfilled and construction schedules are not met. Investments have been dispersed among too many projects, yearly allocations of investment have been too low and at odds with the planned construction periods -- frequently even these low allocations of investment have not been fulfilled. Tardy deliveries of designs and specifications and frequent revisions of designs have handicapped efficient organization of the construction effort. Delays and shortages in the supply of production equipment to be installed also have handicapped construction in heavy industries.

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VI. Construction as a Limiting Factor in Short- and Long-Term Development of Heavy Industry.

The impact of the persistent failures to fulfill construction programs under the Fifth Five Year Plan (1951-55) and during 1956-57 was evident not so much in the years of the Fifth Five Year Plan as it has been and will continue to be evident in the years since 1955. Because the goals for production under the Fifth Five Year Plan generally were fulfilled successfully, some officials high in the planning circles of the USSR failed to understand the meaning of the clear signs of less than adequate performance in construction for heavy industry.

In spite of the considerable underfulfillment of plans for commissioning productive facilities under the Fifth Five Year Plan, plans for production of important products of heavy industry were fulfilled or exceeded. (See Table 10.\*) This situation was at the center of the disagreement expressed at the Twentieth Party Congress as to the volume of investment required to support the production goals for 1956 and the Sixth Five Year Plan (1956-60).

A. Underestimation of the Volume of Capital Construction and Construction Resources Required.

In his speech to the Twentieth Party Congress, M.Z. Saburov (then Chairman of the State Economic Commission) criticized the Ministries of Ferrous Metallurgy, the Coal Industry, the Construction Materials Industry, and several other ministries for having submitted production plans for 1956 which were lower than the goals adopted by the government. He claimed that the ministries had submitted greatly inflated requests for capital investment which were not consistent with the available resources of the economy or with the requirements of the ministries. In support of his position that the ministries were not fully utilizing opportunities for increasing production at established enterprises, Saburov noted that the Fifth Five Year Plan for production of rolled metals had been exceeded by 700,000 tons even though the commissioning of new capacity in rolling mills had fallen 4.8 million tons short of the goal. Similarly, the plan for production of coal was exceeded by 18 million tons, although the commissioning of mines and pits was 21 million tons below the goal. Analogous situations were said to have occurred in a number of other industries. (See Table 10.\*)

The disagreement between the State Economic Commission on the one hand and the ministries on the other as to the volume of capital investment required to support production plans is well exemplified by the

\* Table 10 follows on p. 114.

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Table 10

Fulfillment of Goals for Construction-Installation Work,  
 Commissioning of Capacity, and Production in Selected Heavy Industries  
 in the USSR Under the Fifth Five Year Plan a/  
 (1951-55)

Ministry and Product	Percent		
	Construction- Installation Work	Capacity Commissioned	Production
Ministry of Ferrous Metallurgy	80		
Pig iron		87	99
Crude steel		72	102
Finished steel		56	102
Ministry of the Coal In- dustry	107 <u>b/</u>		
Coal		85 <u>c/</u>	105 <u>d/</u>
Ministry of Electric Power Stations	88		
Electric power		84 <u>e/</u>	104
Ministry of the Petroleum Industry	88		
Petroleum		67 <u>f/</u>	101
Ministry of the Construc- tion Materials Industry	N.A.		
Cement		60 <u>g/</u>	100 <u>h/</u>

a. Except where noted otherwise, all data are from source 359/.

b. 360/

c. 361/

d. 362/

e. In electric power stations.

f. In primary distillation.

g. Estimated. See Table 1, p. 21, above.

h. 363/



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fact that the ministries had demanded capital investment\* for 1956 totaling 60 billion rubles more than the plan adopted for 1956, 364/ an average of 38 percent. 365/

Events during 1956 challenged the judgment of those who had asserted the feasibility of greater production and less investment. Production plans were not met in the ferrous metallurgical, coal, or construction materials industries. According to I.A. Kulev, then Deputy Chairman of the State Economic Commission, these failures occurred chiefly because the production plans in these industries were dependent on new capacities which were not commissioned as scheduled in 1956. The planning organs, particularly the State Economic Commission, had miscalculated the new capacities which could be commissioned in these branches.\*\* 366/

In December 1956 a Plenum of the Central Committee was convened to discuss, among other things, the report of Gosplan on completion of the work of drafting the Sixth Five Year Plan and the report of the State Economic Commission on the economic plan for 1957. In the process of drawing up more specific goals for the Sixth Five Year Plan and the plan for 1957, the disagreement between central planning organs and ministries again became apparent. The ministries and departments requested capital investment for 1957 which was 70 billion rubles greater than provided in the plan, or an average of 40 percent.\*\*\* For the Sixth Five Year Plan they had requested 371.5 billion rubles more than the 990 billion provided, an average of 38 percent.

According to Kulev, the ministries and departments particularly disputed the low investment plan for 1957. The underfulfillment of plans for commissioning new capacity during 1956 had forced the task of completing facilities too much into the following years, 1957-60. Kulev stated further that construction periods in heavy industries, from the start of construction to commissioning the first section of an enterprise, generally run 4 to 5 years. He noted that if construction of new enterprises had not been started in 1957, the installations could not have been commissioned in time to achieve any significant production from the new facilities in the period of the Sixth Five Year Plan. Moreover, the ministries and departments argued that the plans for

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\* The following discussion concerns capital investment in the USSR under the state plan as distinct from total capital investment or investment in heavy industry alone.

\*\* This admission of error still underestimates the impact which shortfalls in commissioning during preceding years had on performance during 1956 and, as such, is only a partial recognition of error.

\*\*\* The plan for state capital investment in 1957 was confirmed at 175 billion rubles. 367/

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commissioning new capacity under the Sixth Five Year Plan, as established by the directives of the Twentieth Party Congress, could not be met unless 70 billion rubles in addition were allocated for 1957. 368/

Having examined the questions at issue, the Plenum of December 1956 criticized Gosplan, the State Economic Commission, and the ministries in general for having planned an excessive volume of construction which resulted in dispersing funds over a great number of new construction projects, prolonged periods of construction, increased costs, and disruption of schedules for constructing and putting facilities into operation. Addressing itself to the shortcomings displayed in the economy during 1956, the Plenum made the following resolutions:

1. The drafting of the Sixth Five Year Plan should be completed, in line with the main tasks as set by the Twentieth Party Congress, and should be submitted in the first half of 1957 for approval of the Supreme Soviet of the USSR.

2. The goals of the Sixth Five Year Plan and the plan for 1957 should be made more specific so as to bring production goals and capital investment into line with material resources available by the following means:

- a. Reducing the volume of capital investments;
- b. Reducing the number of construction projects, particularly new projects;
- c. Preventing the dispersal of funds and, instead, concentrating materials and funds on the most important projects and those nearing completion; and
- d. Revising the goals planned for individual ministries which have not been supplied with sufficient materials.

3. Ways and means should be sought to allocate funds for construction of housing. 369/

In effect, the heart of the disagreement was resolved by deciding that the volume of capital investment proposed by Gosplan under the Sixth Five Year Plan, which the ministries disputed as too low, was excessive and therefore to be reduced. 370/

The Sixth Five Year Plan was not submitted in its completed version. Instead, on 25 September 1957, Soviet authorities announced

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that a Seven Year Plan for the period 1959-65 would be drawn up which would link organically the last 2 years of the Sixth Five Year Plan with the following 5-year plan. 371/ Whatever the ostensible reasons for scrapping the Sixth Five Year Plan, shortfalls in construction for heavy industry and the expected ramifications must have been decisive.

The returns in production which were to be obtained from facilities to be commissioned under the Sixth Five Year Plan were to be considerable in many heavy industries. Shortfalls in commissioning productive facilities in ferrous metallurgy (except pig iron), cement, and coal, however, were substantial under the Fifth Five Year Plan and again in 1956 and 1957. Performance during 1958 seems little improved. Because the national economic plan for 1958 was tied in with the preliminary plans for 1959 and subsequent years, the consistent record of shortfalls in commissionings threatens not only the goals for new capacity under the draft Sixth Five Year Plan but also the groundwork for the new Seven Year Plan (1959-65).

If construction had been lagging\* seriously in only 1 or 2 heavy industries, the problem of overcoming these lags would have been simply a matter of establishing higher priorities in construction for those industries and diverting resources from construction in other heavy industries to the lagging branches without substantially handicapping fulfillment of construction goals in all of heavy industry. With construction for all heavy industries lagging generally, however, the gains from redirecting construction resources entirely within heavy industry can be only marginal. In the absence of a sharp cutback in plans for commissioning new capacity in heavy industry, either a greater volume of construction resources or methods of utilizing more effectively the available resources are required.

Soviet authorities have made much of the malpractice of dispersing investment among too many projects and of the corrective of greater concentration of resources on the most important projects and those nearing completion. The Plenum of December 1956 called for reduction of the volume of capital investment and concentration of available resources. Dispersion of investment can be corrected most simply either by reducing the number of projects under construction and retaining the

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\* In this discussion the terms of reference for lags in construction are the goals of the draft Sixth Five Year Plan. To the extent that previous construction goals for 1960 might be reduced in the Seven Year Plan, the lags become less serious to the new goals but no less serious in their impact on the returns in production which can be expected from newly built facilities.

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size of the investment allocated or by increasing the size of the investment allocated and retaining the number of projects under construction.\*

Soviet authorities have a strong tendency to overestimate the feasibility of reducing the dispersion of investment in heavy industry by way of reducing the number of projects under construction in order to hold the line on investment. In ferrous metallurgy, for example, the exigencies of accelerating completion of productive facilities during 1957 brought forth an upward revision of the initial investment plan for 1957, in spite of the fact that the volume of unfinished construction in the ferrous metallurgical industry had outstripped the growth of investment in recent years.\*\* Similarly, a comprehensive survey of the coal industry at the beginning of 1957 indicated that it was not feasible to reduce the number of mines and pits under construction but that additional starts were required if the plans for commissioning new capacity were to be met.\*\*\*

The converse tendency to underestimate the necessity of increasing investment allocations as a means of accelerating completions and reducing dispersion was indicated by upward revisions of the initial plans for capital investment in the USSR as a whole during 1956, 1957, and 1958.\*\*\*\* The national economic plan for 1957 had been pointed specifically toward bringing the construction program into line with the available resources, toward postponement of new construction starts, toward concentration of investment on the most important projects and those nearing completion, and toward reduction of the volume of unfinished construction in order to accelerate commissioning of new capacities. 373/ Although the plan for construction-installation work in the USSR as a whole was exceeded slightly during 1957 and the plan for capital investment was practically fulfilled, 374/ the volume of unfinished construction rose by about the same absolute volume as it did during 1956. 375/ Plans for commissioning new capacities in heavy industries again were underfulfilled, particularly in the ferrous metallurgical, coal, cement, and precast reinforced concrete industries. These shortfalls in commissionings, however, cannot be attributed to dispersion of investment so much as to the inadequacy of investment allocated.

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\* Clearly, there are several possible combinations of these simple alternatives.

\*\* See III, E, p. 66, above.

\*\*\* See IV, D, 3, p. 87, above.

\*\*\*\* The indications of upward revisions in investment plans are from source 372/. The revisions of investment plans for 1956 and 1957, however, were much less than the overages in requests by the ministries.

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The widespread practice of dispersing investment by planning yearly investments which are considerably less than those required to insure meeting construction schedules for heavy industrial projects is attributable in great part to underestimating the investment required. This practice also results from failure to direct sufficient resources into construction, so that construction organizations frequently are incapable of performing investment programs larger than those allocated at given projects. Moreover, as indicated above, construction organizations frequently do not have sufficient resources at their command to perform even the low yearly investment programs which are assigned.

A great deal of the blame for dispersion of investment has been placed on the former industrial ministries. The ministries sought to start construction of as many projects as possible in order to justify requests for increased investment funds from the state at a later date. 376/ The practice of dispersing investment has not been improved significantly under the reorganized management of construction. 377/ Recent resolutions on measures to correct and prevent dispersion corroborate this fact.

The Party and the government have forbidden the start of construction of new industrial enterprises and structures unless they are provided with the capital investment and material and technical resources which are necessary to construct and commission the enterprises within the periods established by the norms for duration of construction. In the future, investment for new construction is to be allocated only after the projects which are to be commissioned and those which are already under construction have been provided for. 378/ Resolutions and decisions concerning dispersion have been adopted in the past, however, 379/ and what effect the latest decrees will have remains to be seen.

Another factor apparently contributing heavily to underestimating the volume of investment required in heavy industrial construction is the designing process. Designs and specifications are revised frequently, and estimate costs of heavy industrial projects, including coal mines, electric power stations, and metallurgical, chemical, and cement plants, generally are revised upward. 380/ One of the primary measures of the performance of design organizations is their success in reducing the estimate cost of projects designed. This procedure has not been changed, 381/ so that the tendency of design organizations to underestimate the cost of construction probably will continue.

In spite of the many criticisms of the destructive impact of large volumes of unfinished construction, the volumes of construction carryover under the Fifth Five Year Plan, during 1956, 1957, and apparently 1958 have not been large enough to insure fulfillment of

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plans for commissioning new capacity in heavy industry within the investment allocated. A study of projects under way in the construction materials, ferrous metallurgical, and coal industries indicates that the greatest problem in overcoming the persistent shortfalls in commissionings is not that an unduly large number of projects were under way but that greater investment would have been required in order to commission them as planned in 1956 and 1957.

B. Priorities in the Allocation of Construction Resources.

In the first year of the Sixth Five Year Plan, there was not only a considerable shortfall in construction for heavy industry but also a substantial failure to fulfill the plan for commissioning state housing. In addition to calling for a reduction in the volume of capital investment, the Plenum of December 1956 stipulated that ways and means were to be sought to increase investments in construction of housing. 382/

In a decree issued in July 1957 the Party and the government raised the plan for construction of housing above that specified in the draft Sixth Five Year Plan and stated annual goals for 1957-60. Although the plan for commissioning individual housing space was raised substantially and the plan for state housing was increased only nominally, construction of housing clearly had been given a higher priority than in previous years. 383/ This increased priority was confirmed during 1957, when the plan for commissioning state housing was exceeded. 384/

The priority of housing construction was reaffirmed in a preliminary announcement of the Seven Year Plan for construction of state housing which incorporated the decree of July 1957 on construction of housing during 1957-60. 385/ The impact of the program for construction of housing on the availability of resources for construction in heavy industry is considerable. As a result of the increased priority for construction of housing, pressure on the supply of resources will increase and will be especially heavy during 1958-60 in contrast with that expected during 1961-65.\*

As in construction in heavy industry, Soviet authorities seriously underestimate the volume of capital investment and construction resources required to fulfill goals for construction of housing. The draft Sixth Five Year Plan had called for construction costs of state housing\*\* to be reduced by 20 percent during 1956-60, 387/

\* This is because the annual increases in state housing to be commissioned (in terms of housing space) are substantial for 1958-60, whereas the average annual commissioning remaining for 1961-65 is only a little greater than the plan for 1960. 386/

\*\* Costs are stated here in terms of costs per square meter of living space of state housing.

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and the Seven Year Plan calls for the average cost in 1965 to be approximately 21 percent lower than the average cost in 1957. 388/ The plan for 1958 implies a reduction of 9 percent, compared with the cost in 1957. 389/ Planning such reductions in cost simultaneously with planning substantial annual increases in commissioning of housing (at least through 1960) is a questionable procedure. In fact, average costs continued to increase rather than decrease in 1955, 1956, and 1957. 390/

In addition to the underestimation of investment and resources implicit in the unrealistic plans for reducing costs, the Seven Year Plan for capital investment in construction of state housing appears to have been determined by an erroneous method which considerably understates the investment required.\* 391/

Before 1957, lags in construction for heavy industry could be mitigated to some extent by sacrificing fulfillment of plans for construction of housing, but, with the increased priority given construction of housing, much less freedom remains for diverting a greater volume of resources than planned into construction for heavy industry. Yet, unless the annual increases in the programs for construction in heavy industry are cut back from the levels planned in 1956, 1957, and 1958, heavy industry will require even higher priorities than those effected during 1956-57 if shortfalls in commissionings are to be prevented.

C. Conclusions.

The returns in production from facilities of heavy industry to be commissioned during 1956-60, which were anticipated by the draft Sixth Five Year Plan, most certainly have been compromised by the persistent shortfalls in commissionings under the Fifth Five Year Plan and in 1956 and 1957.

Production goals for many products of heavy industry had been fulfilled or exceeded under the Fifth Five Year Plan in spite of substantial underfulfillment of the plans for construction-installation work and of plans for commissioning new capacities. An analogous situation was said to have occurred in previous Five Year Plans. 392/ Influential officials in higher planning levels in the USSR overestimated the returns feasible from intensified utilization of existing

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\* The program laid out for construction of housing in the preliminary announcement of the Seven Year Plan is consistent with the program stated in the theses of the Seven Year Plan. The above conclusions as to the underestimation by Soviet authorities of the resources required to fulfill the program remain valid.

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capacities under the Sixth Five Year Plan and, as a result, underestimated the capital investment and resources required and the necessity for meeting construction schedules if production plans were to be met.

The Plenum of December 1956 achieved little in the way of correcting this miscalculation. Instead, it provided for a reduction in the volume of capital investment. Gosplan maintained that production goals of the draft Sixth Five Year Plan could be met, even with some reduction in the planned volume of capital investment and the consequent reduction in commissioning new capacities, by greater utilization of existing capacities and modernization of production technology. 393/

The national economic plan of the USSR for 1957 set moderate production goals after the failures of 1956, but the plan for commissioning new capacity in heavy industry in 1957 was hardly more realistic than that of 1956. Although the initial plan for capital investment by the state during 1957 was exceeded and the revised plan practically fulfilled, commissionings in heavy industry fell substantially short of plans.

The national economic plan of the USSR for 1958, the year of transition to the Seven Year Plan, was coordinated with the rough outlines of the plan for 1959 and for subsequent years. In spite of the sharp increases in capital investment planned for most heavy industries, several branches failed to achieve plans for commissioning new capacity in the first quarter of 1958, 394/ and some underfulfillment of plans can be expected for the year as a whole.

The tendency of Soviet authorities to underestimate the volume of capital investment and resources required to support their plans may well work to the detriment of the new Seven Year Plan. The unrealistic program for construction of housing in conjunction with the higher priority now accorded housing already has prejudiced the availability of resources for construction in heavy industry, particularly during 1958-60. Unless the program for construction in heavy industry is set at modest rates of growth, the drain on construction resources which unquestionably would accompany fulfillment of plans for construction of housing cannot help having a negative impact on construction for heavy industry.



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APPENDIX A

METHODOLOGY

1. Lags in Construction.

Because reports of lagging construction in the editorials of such politico-economic journals as Pravda and Izvestiya frequently are exhortations for greater and better performance rather than considered judgments concerning lags in construction in respect to plans, use of such sources in support of the occurrence of lags was restricted in this report to cases where independent data also indicated lags. Patently exhortative complaints of lags in construction were excluded altogether.

2. Deliberate Setting of High Goals for Construction.

No methodology is available to resolve the question of whether or not the planning authorities deliberately establish goals higher than expected to be achieved as a socio-psychological tool for maximizing incentives and performance. The degrees to which construction goals might thereby be overplanned is unanswerable. The size of shortfalls in construction during recent years, however, is a strong indication that the factor of overplanning has played only a small role, if any. Moreover, the speeches at the Twentieth Party Congress and the revelations of the disagreements expressed about the goals of the draft Sixth Five Year Plan (1956-60) indicate that the high planning officials wanted and expected to fulfill the goals for production in heavy industry at the low cost implicit in the capital investment plan.

3. Production Capacity.

The concept of production capacity is an integral part of the methodology of this report. The definition and scope of capacity varies from industry to industry, but within each industry the concept is meaningful. Soviet construction schedules do specify the amount of capacity which is to be commissioned as a result of commissioning a given project. Although there undoubtedly are marginal differences in the interpretation of capacity even within a given industry, the data on capacity commissioned and not commissioned reliably reflect the capabilities in production which were or were not turned over by the construction organization on completion of its contract. The extent to which the capacity is utilized and the time involved is a more tenuous step in the analysis and is discussed in Appendix B.

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4. The Negative Approach.

This report approaches analysis of performance in construction in the Soviet economy from the point of view of performance in relation to plans. Perhaps it is unnecessary to point out that the conclusion that goals for constructing and commissioning productive facilities in heavy industry generally have been substantially underfulfilled does not preclude the conclusion that the achievements in construction have played a large part in the substantial rates of growth achieved in the Soviet economy.

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