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PROVISIONAL INTELLIGENCE REPORT

THE FERROUS METALLURGICAL INDUSTRY OF RUMANIA



CIA/RR PR-164

26 June 1957

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PROVISIONAL INTELLIGENCE REPORT

THE FERROUS METALLURGICAL INDUSTRY OF RUMANIA

CIA/RR PR-164

(ORR Project 23.609)

NOTICE

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FOREWORD

This report analyzes the ferrous metallurgical industry of Rumania -- its economic aspects, the reasons for its failure to meet its goals under the First Five Year Plan (1951-55), and its ability to attain its goals under the Second Five Year Plan (1956-60). The report includes a discussion of resources and supplies of the principal raw and alloying materials essential to that industry.

Because of limitations of source material, it has not been possible to establish patterns of product mix, consumption, and distribution of finished steel products.

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THE FERROUS METALLURGICAL INDUSTRY OF RUMANIA*

Summary

The ferrous metallurgical industry of Rumania, lacking adequate raw materials and hampered by inefficient operation and a low level of technology, has failed repeatedly to meet the requirements of the Rumanian economy for iron and steel. In 1955, Rumania produced only 47 percent of the iron ore and 25 percent of the metallurgical coke required by the industry. Rumanian production of pig iron in 1955 was 225,000 metric tons** short of requirements, and the total production of crude steel*** in 1955 -- 765,000 tons, which is less than the annual production of one medium-size plant in the US or the USSR -- was 485,000 tons short of the planned goal. To meet the needs of the Rumanian economy in 1955, about 236,000 tons of finished and semifinished steel were imported.

In spite of the inadequacies of the Rumanian ferrous metallurgical industry and in spite of the relatively high cost of production, the industry provides supplies of iron and steel that otherwise might not be available to the Rumanian economy in view of the inadequacy of the supply of these materials in the Soviet Bloc.

Under the Rumanian Second Five Year Plan (1956-60), production of iron ore, pig iron, and finished steel is scheduled to be doubled. The attainment of the goals for production of ferrous metallurgical materials will depend largely on the construction of new facilities, and the Plan allocates 7.2 billion lei**** for investment in the ferrous metallurgical industry. On the basis of past performance and in view of information received immediately before publication that production of pig iron and steel in 1956 increased only 2 percent above that in 1955, compared with a planned annual rate of increase of approximately 16 percent, it appears unlikely that the Rumanian ferrous metallurgical industry will achieve its goals for 1960 in either construction or production.

* The estimates and conclusions contained in this report represent the best judgment of ORR as of 1 January 1957.

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

*** Crude steel includes steel ingots and steel for castings.

**** The official rate of exchange of 6 lei to US \$1 is not necessarily an accurate reflection of the dollar value.

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I. Introduction.

A. History.

The iron and steel industry of Rumania began to expand slightly after World War I, when some of the iron ore ranges and coalfields of the former Austro-Hungarian Empire were annexed.

In 1926 the three main producing interests -- the Recita (Resita)* Steel Works, the Titan-Nadrag-Calan coalition, and the wire industry -- entered into a cooperative arrangement, and by 1929 their production of crude steel had reached 161,000 tons. 1/** Foreign interests gained control in 1930 and shortly thereafter divided the industry into four main groups: (1) the Malaxa companies, (2) the Titan-Nadrag-Calan Combine, (3) the Recita Steel Works, and (4) the Zbrojorka concern (which controlled some armament plants and the wire industry and was part owner of the Recita Steel Works). 2/

During World War II the Rumanian steel industry was controlled by the Germans, under whom production of crude steel reached 324,000 tons annually compared with the prewar high of 284,000 tons achieved in 1938. 3/ Although war damage was minor, production of crude steel declined gradually from 1943 to 1947. 4/

On 11 July 1948 the industry was nationalized under the Ministry of Metallurgy and Chemical Industry. 5/ After two One Year Plans in 1949 and 1950, the First Five Year Plan (1951-55) started with the following goals for 1955 6/:

<u>Product</u>	<u>Metric Tons</u>
Iron ore	750,000
Pig iron	800,000
Crude steel	1,250,000
Rolled steel	828,000

None of these goals was achieved.

B. Organization and Administration.

After nationalization in 1948 the ferrous metallurgical industry of Rumania was placed under the control of the State Enterprise for

* For the location of cities and other geographic features, see the map inside back cover.

** For serially numbered source references, see Appendix D.

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Metallurgy (IMS). 7/ Following an unsettled period in 1949, all metallurgical works and heavy industries were placed under the Ministry of Metallurgy and Chemical Industry. 8/ In November 1952 this ministry was divided into two ministries, one of which, the Ministry of the Metallurgical Industry and Machine Building, controls the ferrous metallurgical industry. 9/

The Ministry of the Metallurgical Industry and Machine Building, headed by Gherasim Popa, who is assisted by 5 deputy ministers, is divided into 13 general directorates. The general directorates which administer the ferrous metallurgical industry are the General Directorate of Ferrous Metallurgy, the General Directorate of Iron Mines and Refractory Materials, the General Directorate of Iron Smelting, and the General Directorate of Metallurgy. 10/ It is not known whether these directorates are all on the same administrative level. It is presumed, however, that the General Directorate of Iron Mines and Refractory Materials and the General Directorate of Iron Smelting are under the General Directorate of Ferrous Metallurgy, which in turn is under the General Directorate of Metallurgy.

The Ministry of the Metallurgical Industry and Machine Building also includes two institutes, located in Bucharest, which are identified with the ferrous metallurgical industry: the Institute of Metallurgical Planning and the Institute for the Planning of Metallurgical Factories and Installations. 11/

II. Supply.

A. Pig Iron and Steel.

1. Pig Iron.

In 1955, Rumania produced 575,000 tons of pig iron, which represents an increase of 332 percent above production in 1938 but an increase of only 80 percent during the period of the First Five Year Plan. Production failed to meet the planned goal by 225,000 tons, about 28 percent. Reported production of pig iron in Rumania in 1938 and 1948-56 and planned production in 1960 are shown in Table 1.*

* Table 1 follows on p. 4.

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Table 1

Production of Pig Iron in Rumania
1938, 1948-56, and 1960 Plan

Thousand Metric Tons				
<u>Year</u>	<u>Amount</u>		<u>Year</u>	<u>Amount</u>
1938	133 <u>a/</u>		1953	456 <u>a/</u>
1948	191 <u>b/</u>		1954	432 <u>a/</u>
1949	275 <u>b/</u>		1955	575 <u>a/</u>
1950	320 <u>a/</u>		1956	586 <u>c/</u>
1951	350 <u>a/</u>		1960	1,150 <u>d/</u>
1952	390 <u>a/</u>			

a. 12/b. 13/c. Production in 1956 was reported to
have been 102 percent of that in 1955. 14/d. 1960 Plan. 15/

In 1955, operating with a coefficient of utilization of 1.46* (compared with 0.80 attained in the USSR), Rumanian production was considerably below estimated blast furnace capacity as measured by levels of utilization maintained in the USSR.** Despite an increase in blast furnace capacity of approximately 150,000 tons in 1956 through the installation in May of a 700-ton-per-day furnace at the Gheorghiu-Dej plant, 16/ production in 1956 was only 11,000 tons greater than that in 1955.

Pig iron is produced in only four plants in Rumania. Two plants, the Gheorghiu-Dej and the Recita Combines, which are the only two fully integrated steel plants in Rumania, accounted for 85 percent of production in 1955.***

* A coefficient of utilization of 1.46 indicates that 1.46 cubic meters of effective blast furnace volume were required to produce 1 ton of pig iron in a 24-hour period. Consequently, the higher the coefficient, the less efficient is the operation of a blast furnace.

** For methodology, see Appendix B.

*** For blast furnace facilities, see Table 10, Appendix A, p. 29, below.

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Although production was far short of the goal, there is no evidence that Rumania imported pig iron in 1955. Production was supplemented by imports of 35,000 tons in 1952, 52,000 tons in 1953, and a much smaller amount in 1954. The USSR was the principal supplier, with minor shipments having been received from West Germany and the Belgium-Luxembourg Economic Union. 17/

The 1960 Plan for production of pig iron is 1.15 million tons, which will maintain about the same ratio between production of pig iron and that of crude steel which existed in 1955. The goal for 1960 is planned to be achieved by the construction of 3 blast furnaces with a combined effective volume of 1,850 cubic meters, 18/ which, at the level of efficiency of operations maintained in 1955, would increase annual production by 430,000 tons. An increase of 17 percent in production, however, through better utilization of facilities is planned for the next 5 years. 19/ When applied to existing blast furnaces and to those to be constructed, this increase in efficiency provides capacity for approximately the amount of pig iron planned for production in 1960. The planned improvement in the utilization of blast furnaces appears to be entirely feasible through the adoption of modern blast furnace technology and the improved preparation of raw materials. Rumanian blast furnaces are not equipped for high top pressure or moisture control of the blast, and the use of sintered ore is limited. Application of these practices might easily result in greater efficiency than that planned.

2. Crude Steel.

In 1955, Rumania produced 765,000 tons of crude steel, including 692,000 tons of open hearth steel and 73,000 tons of electric furnace steel, in 11 plants operating 22 open hearth and 14 electric furnaces. Production in 1955, although 169 percent above that in 1938, increased only 38 percent above that in 1950 and fell far short of meeting the original goal of 1.25 million tons of crude steel in 1955. 20/ Reported production of crude steel in Rumania in 1938 and 1948-56 and planned production in 1960 are shown in Table 2.*

* Table 2 follows on p. 6.

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Table 2

Production of Crude Steel in Rumania
1938, 1948-56, and 1960 Plan

Thousand Metric Tons				
<u>Year</u>	<u>Amount</u>		<u>Year</u>	<u>Amount</u>
1938	284 <u>a/</u>		1953	716 <u>a/</u>
1948	340 <u>b/</u>		1954	627 <u>a/</u>
1949	459 <u>b/</u>		1955	765 <u>a/</u>
1950	555 <u>a/</u>		1956	780 <u>c/</u>
1951	644 <u>a/</u>		1960	1,700 <u>d/</u>
1952	695 <u>a/</u>			

a. 21/

b. 22/

c. Production in 1956 was reported to have been 102 percent of that in 1955. 23/

d. 1960 Plan. 24/

It is estimated that the two fully integrated steel plants in Rumania, Gheorghiu-Dej at Hunedoara and Recita, accounted for almost two-thirds of the crude steel produced in 1955. The remainder was produced in 4 nonintegrated steel plants and 5 foundries in machine building plants.*

In 1955 the steelmaking facilities of Rumania operated at about 75 percent of capacity** as measured by the levels of utilization maintained in the USSR. The failure to produce at full capacity has been attributed by the Rumanian press to inefficient operations and poor planning. 25/ To some extent the low rate of operation may have been caused by a shortage of the necessary pig iron and scrap.

* For a list of steelmaking facilities in Rumania, see Table 10, Appendix A, p. 29, below.

** For methodology, see Appendix B.

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The goal for production of crude steel in 1960 is approximately 1.7 million tons, or 120 percent above that in 1955. ^{26/} To meet this goal, a 700,000-ton open hearth shop and a 40,000-ton electric steel plant are to be constructed at the Gheorghiu-Dej Steel Combine. ^{27/} The planned additional capacity, when coupled with production in 1955, is 200,000 tons short of the goal for 1960. The Second Five Year Plan, however, calls for an increase of 22 percent in the utilization of steelmaking facilities which existed in 1955. ^{28/} Such an improvement in steelmaking practices would permit the achievement of the planned goal but would require raising the efficiency of Rumanian furnaces almost to the Soviet level.

3. Finished Steel.

The 567,000 tons of finished rolled steel produced in Rumania in 1955, even when supplemented by estimated imports of 236,000 tons,* failed to meet domestic requirements. ^{29/} Production in 1955 showed an increase of less than 24 percent over that in 1950 and was 261,000 tons short of the goal. Rolling mill facilities were adequate to produce the planned tonnage; therefore underfull-
fillment of the Plan was caused by the failure to meet the planned production of crude steel. Production of finished steel, including reported production of rolled steel and estimated production of steel castings, in 1938 and 1948-56 and planned production of rolled steel in 1960, are shown in Table 3.**

Rumania produces a wide range of finished steel products, including structural shapes, plates, bars, hot and cold rolled sheets, rails, tubes, wire, railroad car wheels, axles, tinplate, castings, and forgings in 42 rolling mills, 9 steel foundries, 7 forge shops, and 1 tinplate mill.***

During the period of the First Five Year Plan, particularly in 1955, Rumania depended on imports for approximately 30 percent of its apparent consumption of semifinished and finished steel. The USSR steadily increased exports of finished steel to

* For Rumanian imports of steel, see Table 4, p. 10, below.

** Table 3 follows on p. 8.

*** For a list of the types of finished steel produced at each plant, see Table 10, Appendix A, p. 29, below.

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Table 3

Estimated and Reported Production of Finished Steel in Rumania
1938, 1948-56, and 1960 Plan

Thousand Metric Tons					
Year	Amount		Year	Amount	
	Rolled <u>a/</u>	Castings <u>b/</u>		Rolled <u>a/</u>	Castings <u>b/</u>
1938	318	31	1953	N.A. <u>c/</u>	62
1948	306	31	1954	502 <u>a/</u>	50
1949	349	35	1955	567 <u>a/</u>	57
1950	459	46	1956	595 <u>d/</u>	67
1951	523	52	1960	1,100 <u>e/</u>	N.A.
1952	607	61			

a. 30/. Figures were reported.

b. Figures are estimates based on a detailed study of the steel foundries of Rumania.

c. An estimate proportionate to production of crude steel would be 625,000 tons. In 1953, however, the importation of quantities of semifinished steel undoubtedly affected production of finished steel.

d. Production in 1956 was reported to have been 105 percent of that in 1955. 31/

e. 1960 Plan. 32/

Rumania from 1952 to 1955, and by 1955 the USSR supplied about 75 percent of such imports by Rumania.*

The USSR not only has supplanted Western nations as a source of supply for Rumania but also has reduced the supply role of other European Satellites. In 1952, 85,000 tons of semifinished and finished steel were imported from the West, 60,000 tons from the USSR, and 30,000 tons from the Satellites. In 1955, 180,000 tons came from the USSR, but only 39,000 tons came from the West, and known Satellite shipments were limited to 17,000 tons from Czechoslovakia.

* For Rumanian imports of steel, see Table 4, p. 10, below.

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The quantities of each class of steel product imported by Rumania cannot be determined accurately. Shipments from the West, however, consisted principally of billets, bars, structural shapes, sheets, plates, and rails. Structural shapes, pipe, and tubing constituted the major portion of imports from the USSR. Reported Rumanian imports of semifinished and finished steel in 1937 and 1952-55, by country of origin, are shown in Table 4.*

The Rumanian goal for production of rolled steel items in 1960 is 1.1 million tons, an increase of 94 percent above production in 1955. 33/ The ratio of production of finished steel to production of crude steel, therefore, will probably be lower in 1960 than in 1955 (1955 ratio: 0.74; 1960 ratio: 0.65). The decreased recovery of finished steel from ingots planned for 1960 may be a reflection of the emphasis that the Second Five Year Plan places on increased production of high-quality carbon and alloy steel items. The lower ratio also may indicate that Rumania no longer plans to import billets for production of finished steel. The increases planned for production in 1960 compared with production in 1955 are shown in the following tabulation 34/:

<u>Product</u>	<u>Percent Increase</u>
High-quality carbon steels	230
Alloy steels	260
Tinplate	100
Sheets	65
Wire	100

The planned emphasis on production of quality and alloy steels may also indicate the inadequacy of production of such items under the First Five Year Plan.

Seventy percent of the increase in production of rolled steel planned for 1960 is expected to be achieved from more efficient utilization of the facilities for rolling steel existing in Rumania in 1955. 35/ Facilities for finishing steel planned for completion during the next 5 years include a seamless tube mill at Roman (46°55' N - 26°54' E) with an annual capacity of 300,000 tons, a

* Table 4 follows on p. 10.

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Table 4

Imports of Finished and Semifinished Steel by Rumania
1937 and 1952-55

Exporting Country	Thousand Metric Tons				
	1937	1952	1953	1954	1955
USSR	N.A.	60 <u>a/</u>	120 <u>b/</u>	150 <u>c/</u>	180 <u>b/</u>
Czechoslovakia	17 <u>d/</u>	26 <u>e/</u>	23 <u>e/</u>	20 <u>e/</u>	17 <u>e/</u>
East Germany	N.A. <u>f/</u>	2 <u>g/</u>	N.A.	N.A.	N.A.
Hungary	35 <u>d/</u>	N.A.	N.A.	N.A. <u>h/</u>	N.A.
Poland	8 <u>d/</u>	2 <u>i/</u>	N.A.	N.A.	N.A.
Total Bloc	<u>60</u>	<u>90</u>	<u>143</u>	<u>170</u>	<u>197</u>
Austria	4 <u>d/</u>	3 <u>j/</u>	10 <u>j/</u>	3 <u>k/</u>	7 <u>l/</u>
Belgium-Luxembourg	18 <u>d/</u>	72 <u>m/</u>	70 <u>n/</u>	3 <u>o/</u>	8 <u>p/</u>
France	19 <u>d/</u>	5 <u>q/</u>	70 <u>r/</u>	3 <u>r/</u>	22 <u>s/</u>
West Germany	39 <u>d/</u>	5 <u>t/</u>	14 <u>u/</u>	4 <u>v/</u>	2 <u>w/</u>
UK	2 <u>d/</u>	N.A.	1 <u>d/</u>	1 <u>x/</u>	Negligible
Total West	<u>82</u>	<u>85</u>	<u>165</u>	<u>14</u>	<u>39</u>
Total imports	<u>142</u>	<u>175</u>	<u>308</u>	<u>184</u>	<u>236</u>

- | | |
|---|----------------------------------|
| a. <u>36/</u> | k. <u>45/</u> . See methodology. |
| b. <u>37/</u> | l. <u>46/</u> . See methodology. |
| c. <u>38/</u> | m. <u>47/</u> |
| d. <u>39/</u> | n. <u>48/</u> |
| e. <u>40/</u> | o. <u>49/</u> |
| f. Figures are not available for that section of Germany which now constitutes East Germany. | p. <u>50/</u> |
| g. <u>41/</u> | q. <u>51/</u> |
| h. The 1954 Hungarian-Rumanian Trade Agreement called for Hungarian exports of rolled steel. <u>42/</u> | r. <u>52/</u> |
| i. <u>43/</u> | s. <u>53/</u> |
| j. <u>44/</u> | t. See methodology. |
| | u. <u>54/</u> . See methodology. |
| | v. <u>55/</u> |
| | w. <u>56/</u> |
| | x. See methodology. |

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structural mill at an unknown location with an annual capacity of 550,000 tons, and a sheet mill at the Christea Nicolae Steel Works at Galati (45°27' N - 28°03' E) with an unknown capacity. 57/ Successful execution of these plans will provide the industry with approximately 850,000 tons of rolling mill capacity in excess of that needed for planned production and will permit considerable expansion in production of crude steel unless certain obsolete facilities for rolling steel are retired. If the Rumanians elect to keep obsolete facilities in operation, finishing capacity would be more than adequate to exceed the goals established for 1960.

B. Raw Materials.

1. Iron Ore.

a. Reserves.

The proved and possible reserves of iron ore in Rumania were estimated at 29.7 million tons in 1952. 58/ Approximately 2.5 million tons have been produced since 1952, and no new discoveries have been announced. The iron content of the ore ranges from 30 to 68 percent throughout the 5 major fields. The average ore mined in 1955 was 45 percent iron. 59/

The richest Rumanian iron ores are found in the Banat area, with main operations in the vicinity of Ocna de Fier and Dognecea. 60/ Reserves in this field amount to 7.1 million tons, of which 1.8 million tons are proved. The iron content of this ore averages 60 percent. 61/

The Poiana Ruscai district has the largest reserves of ore in Rumania -- nearly 17 million tons, of which 3.7 million tons are proved. The iron content of the ores from this district ranges from 34 to 65 percent, and averages approximately 40 percent. 62/

Other reserves are located in the Odorhei district, which has 1.4 million tons of ore averaging 30 percent iron content, and in the Bihor district, which has 3.4 million tons of ore averaging 40 percent iron content. 63/

Because only 21.4 percent of the total reserves are reported as proved, 64/ the supply of proved iron ore reserves in Rumania would be nearly exhausted by the end of 1960 if the iron and steel industry were to depend solely on domestic sources. The current heavy reliance on imports of iron ore, therefore, is expected to continue.

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b. Production and Supply.

Although Rumanian production of 600,000 tons of iron ore in 1955 was 4.3 times that in 1938 and represented an increase of 53 percent above that in 1950, production was below the levels attained in 1952 and 1953. From 1951 to 1955, as production of pig iron increased, Rumania supplied a decreasing percentage of its requirements for iron ore in terms of iron content, the figure declining from 75 percent in 1952 to 47 percent in 1955. Reported production of iron ore in Rumania, in terms of 45 percent iron content, in 1938 and 1948-56 and planned production in 1960 are shown in Table 5.

Table 5

Production of Iron Ore in Rumania a/
1938, 1948-56, and 1960 Plan

Thousand Metric Tons				
<u>Year</u>	<u>Amount</u>		<u>Year</u>	<u>Amount</u>
1938	139 <u>b/</u>		1953	695 <u>d/</u>
1948	176 <u>c/</u>		1954	510 <u>f/</u>
1949	220 <u>c/</u>		1955	600 <u>d/</u>
1950	392 <u>d/</u>		1956	654 <u>g/</u>
1951	474 <u>e/</u>		1960	1,200 <u>h/</u>
1952	649 <u>e/</u>			

a. Iron ore of 45 percent iron content.

b. 65/

c. 66/

d. 67/

e. 68/

f. 69/

g. Production in 1956 was reported to have been 109 percent of that in 1955. 70/

h. 1960 Plan. 71/

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The decrease in production of iron ore since 1953 is attributed to poor organization, low productivity of labor, and other operational difficulties. According to official statements, the iron mining industry has not lacked new, modern equipment. 72/

Domestic production of iron ore in Rumania has been consistently inadequate to meet requirements for production of pig iron. Even in 1953, the year of peak production, 300,000 tons were imported from the USSR, 73/ 50,000 tons from India,* and 30,000 tons from Communist China. 74/ Since 1953 there has been no reliable information concerning imports. On the basis of officially announced figures for production of pig iron and iron ore, it is estimated that minimum imports of iron ore (53 percent iron content) amounted to 380,000 tons in 1954 and 575,000 tons in 1955. The principal supplier has been the USSR, which is estimated to have shipped at least 300,000 tons annually during the period of the Rumanian First Five Year Plan. Rumania also receives occasional shipments from India and Communist China.

By 1960, production of iron ore is scheduled to be twice that in 1955, but production of pig iron is also to be doubled. Consequently, Rumania will be less self-sufficient in iron ore in 1960 than in 1955, and import requirements will have to be doubled. To compensate for this deficiency in Rumania and in other European Satellites, the USSR plans to export to these countries by 1960 twice the amount of iron ore supplied in 1955. 75/

2. Manganese Ore.

a. Reserves.

At the rate of exploitation proposed in the Second Five Year Plan, the presently known reserves of manganese ore in Rumania will be nearly exhausted by 1966. Rumanian reserves of manganese ore are conservatively estimated at 4.5 million tons. 76/ Only 1 of the 6 major deposits, however, contains ore with a manganese content approaching 45 percent, which is considered to be the standard grade of ore suitable for production of ferromanganese. This deposit is in Bucea-Godinesti district in the Zarandului Mountains and has estimated reserves of 0.5 million tons. 77/

* For methodology, see Appendix B.

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The largest deposit of manganese ore in Rumania is the Razoare-Durusa deposit, with 1.5 million tons of ore reserves of 24 to 34 percent manganese content and a manganese-to-iron ratio of 1 to 1. The next largest deposit, Delinesti-Ohabita, contains 1.2 million tons of ore of 26 to 32 percent manganese content with a manganese-to-iron ratio of 2 to 1. The remaining three major deposits -- the Iacobeni - Sarul-Dornei, the Sasca-Montana - Moldova, and the Moneasa-Vascau districts -- contain reserves of 1.2 million tons of ore of 27 to 34 percent manganese content. 78/

b. Production and Supply.

Rumania did little to develop production of manganese ore before 1951. Under the First Five Year Plan, the mining of manganese increased rapidly and steadily, reaching a total of 390,000 tons in 1955, or 4.2 times production in 1950. Reported production of manganese ore in Rumania in 1938 and 1948-55, estimated production in 1956, and planned production in 1960 are shown in Table 6.

Table 6

Estimated and Reported Production
of Manganese Ore in Rumania
1938, 1948-56, and 1960 Plan

Thousand Metric Tons			
<u>Year</u>	<u>Amount</u>	<u>Year</u>	<u>Amount</u>
1938	60 <u>a/</u>	1953	180 <u>b/</u>
1948	51 <u>b/</u>	1954	273 <u>b/</u>
1949	67 <u>b/</u>	1955	390 <u>a/</u>
1950	93 <u>a/</u>	1956	417 <u>c/</u>
1951	122 <u>b/</u>	1960	546 <u>d/</u>
1952	150 <u>b/</u>		

a. 79/

b. 80/

c. Estimate based on production in 1955, planned production in 1960, and use of the compound interest formula.

d. 1960 Plan. 81/

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Most of the increase in production of manganese ore in 1955 is attributed to the manganese mines in the Dornei field (47°22' N - 25°21' E), which increased production 500 percent above that in 1951, and to those in the Delinesti area, which increased production 200 percent above that in 1951. 82/ Because the average manganese content of the ores in these 2 deposits ranges from 26 to 34 percent, it is believed that the bulk of the manganese ore produced in Rumania is unsuitable for production of ferromanganese. Ores of this grade, however, are satisfactory for use in blast furnaces.

It is not known whether Rumania concentrates any of its manganese ore. The Plan for 1949 included the completion of a concentration plant at Iacobeni (47°26' N - 25°18' E), 83/ but the plant has not been mentioned since 1949. Ferromanganese and silico-manganese are produced at Chemical Combine No. 2 at Tarnova (46°20' N - 21°47' E), formerly known as Diciosanmartin. 84/ It is probable that only ore of 45 percent manganese content from the Bucea-Godinesti district is used for this purpose. It is conservatively estimated that reserves in the Bucea-Godinesti district will last 15 years at the present rate of consumption.

Rumania receives iron and coke which have a high sulfur content from the Krivoy Rog and Donbas areas of the USSR. These imports account for more than 50 percent of the Rumanian supplies. The Ukrainian SSR receives all of its iron ore and coke from the same areas. It is reasonable to assume, therefore, that the input of manganese per ton of pig iron is the same in Rumania as in the Ukrainian SSR. On this basis, estimated consumption of manganese by the Rumanian steel industry in 1955 amounted to 70,000 tons of 35-percent ore. Because much of the Rumanian ore does not run so high as 35 percent metallic content, the actual consumption of ore may be greater than 70,000 tons.

Production of manganese in Rumania in 1955 was sufficient to meet domestic requirements and to provide approximately 300,000 additional tons of manganese ore, which was used primarily for export. Figures on exports are not available, but in 1955 Rumania contracted to ship 66,000 tons to East Germany and also supplied manganese to Czechoslovakia and Poland. 85/ There were also negotiations for exporting manganese to Sweden. 86/

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3. Metallurgical Coke.

a. Reserves of Coking Coal.

Reserves of coking coal in Rumania have been estimated as high as 110 million tons, but minable reserves may be much less. 87/ The two principal deposits of bituminous coking coal are the Petroseni deposit (45°25' N - 23°22' E) and the Anina deposit (45°06' N - 21°52' E), just south of Recita. The Anina deposit is reported to contain 48 million tons of coking coal. 88/ The quality of coal in both these areas is similar to the Hungarian Pecs coal, being high in sulfur and ash content and requiring extensive cleaning to make good-quality coke. 89/

b. Production and Supply.

Rumanian production of coke in 1955, 65 percent of which was estimated to be of metallurgical grade, was nearly 3 times that in 1950 but failed to meet the goal for 1955 by 50 percent. Reported production of coke, including both metallurgical and gas coke, in Rumania in 1938 and 1948-56, and planned production in 1960 are shown in Table 7.*

It is estimated that about 230,000 tons of the coke produced in 1955 was metallurgical coke, produced in 2 batteries at the Recita Iron and Steel Works and 1 battery at the Gheorghiu-Dej Steel Combine. The remaining 120,000 tons produced in 1955 were all gas coke produced in plants located at Petroseni, Petrila (45°27' N - 23°27' E), and Lupeni (45°22' N - 23°15' E). The coking facilities at Recita consist of 2 batteries with 90,000 tons of annual capacity each. The first of 3 batteries, each with 200,000 tons of annual capacity, planned for the Gheorghiu-Dej Combine, began producing in mid-1955.** 90/

Rumania, never able to supply the requirements for coke of its iron, steel, and chemical industries from domestic production, has increased imports of metallurgical coke to keep pace with requirements. The total imports of coke were slightly more than 600,000 tons in 1955. 91/ The principal source has been the USSR, which supplied at least 205,000 tons in 1954 and 370,000 tons in 1955. 92/ The only other suppliers were Czechoslovakia and Poland. 93/

* Table 7 follows on p. 17.

** For metallurgical coking facilities, see Table 10, Appendix A, p. 29, below.

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Table 7

Production of Coke in Rumania
1938, 1948-56, and 1960 Plan

Thousand Metric Tons			
<u>Year</u>	<u>Amount</u>	<u>Year</u>	<u>Amount</u>
1938	86 <u>a/</u>	1953	260 <u>e/</u>
1948	80 <u>b/</u>	1954	265 <u>f/</u>
1949	100 <u>b/</u>	1955	350 <u>g/</u>
1950	120 <u>b/</u>	1956	530 <u>h/</u>
1951	156 <u>c/</u>	1960	1,750 <u>i/</u>
1952	216 <u>d/</u>		

a. 94/

b. 95/

c. 96/

d. 97/

e. 98/

f. 99/

g. 100/

h. Production of metallurgical coke in 1956 was reported to have been 178 percent of that in 1955. 101/

i. 1960 Plan. 102/

Approximately 800,000 tons of metallurgical coke were available in Rumania in 1955, and it is estimated that about 635,000 tons were consumed in production of pig iron, 35,000 tons by the iron founding industry, and 120,000 tons by the chemical industry in production of soda ash and calcium carbide.

To meet requirements for metallurgical coke, for production of pig iron alone, production in 1960 is scheduled to be 5 times that in 1955. 103/ Based on estimates for 1955, the goal for production of metallurgical coke in 1960 is 1.15 million tons. Production planned for 1960 is expected to be achieved by the construction of 2 coke batteries with a combined annual capacity of 400,000 tons at the Gheorghiu-Dej Steel Combine 104/ and by the expansion of the facilities at Recita to an annual capacity of 800,000

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tons. 105/ If successfully executed, these plans would give Rumania a total metallurgical coking capacity of 1.4 million tons, which would be more than adequate to meet requirements indicated by the goals for 1960.

4. Iron and Steel Scrap.

Responsibility for the collection and allocation of ferrous scrap rests with the Rumanian State Enterprise for the Collection of Metals (ICM), which has headquarters in the Ministry of Metallurgy and Machine Building. This organization also controls the use of all metals stored as raw material inventories in plants. 106/ Prices set by the ministry are charged a plant even for the use of self-generated scrap. 107/

Consumption of scrap by the ferrous metallurgical industry of Rumania during the decade preceding World War II was consistently high, averaging 70 to 80 percent of the open hearth charge. Available war scrap was responsible for the continued high scrap-to-pig-iron ratio until 1948. By emphasizing the collection and distribution of scrap and by increasing the pig iron charge, Rumania avoided serious shortages. The use of scrap in open hearth steelmaking declined gradually after 1948 to 30 to 40 percent of the charge in 1956. 108/

C. Alloying Materials.

1. Ferroalloy Ores.

In addition to reserves of manganese ore, Rumania has a substantial deposit of chromium ore and a small deposit of molybdenum ore. Although deposits of nickel, cobalt, tungsten, and titanium ores are known to exist, the extent of these reserves is not known, and mining of these materials is negligible or nonexistent.

a. Chromium Ore.

Chromium ore is found in only one part of Rumania, the Banat region, south of Timis Province. This ore has a chromium content ranging from 18 to 40 percent, but it also has an iron content that makes it unsuitable for metallurgical use. Estimates of reserves range from 2 million to 10 million tons. The most plausible estimate appears to be 4 million tons. 109/

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Reportedly the Germans produced 40,000 tons of chromite from this area in 1917, but there is no indication of subsequent mining until 1942, when 500 tons were mined. 110/ Production of chromium ore was negligible during World War II and immediately thereafter. Estimated production of chromium ore in Rumania, in terms of 45 percent chromite, in 1948-55 is shown in Table 8.

Table 8

Estimated Production of Chromium Ore in Rumania a/
1948-55

Metric Tons				
<u>Year</u>	<u>Amount</u>		<u>Year</u>	<u>Amount</u>
1948	200 <u>b/</u>		1952	21,800 <u>c/</u>
1949	8,000 <u>b/</u>		1953	35,900 <u>c/</u>
1950	8,000 <u>b/</u>		1954	59,300 <u>c/</u>
1951	13,200 <u>c/</u>		1955	98,000 <u>d/</u>

a. Chromium ore 45 percent chromite.

b. Reported. 111/

c. Derived from the use of a compound interest formula to establish the annual increase for the years 1951-54. Estimates have been rounded to the nearest 100 tons.

d. Reported. 112/

Because the chromite is unsuitable for metallurgical use and there is little evidence of refractory production, most of the Rumanian production is available for export. An estimate of exports, however, cannot be made, because of the shipment of substantial but unidentified quantities of Albanian chromite through Rumania.

b. Molybdenum Ore.

Deposits of molybdenum ore in the vicinity of Baita (46°40' N - 22°38' E) in the Bihor district of Somes Province in Rumania were estimated to contain about 8,000 tons of 0.75 to 0.85 percent molybdenite ore in 1952. Deposits of 0.15 to 0.24 percent

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0.24 percent molybdenite ore are located in the Metalici Mountains (46°18' N - 22°50' E). 113/ No new discoveries or extensions of these known deposits have been reported.

After exploitation by the Germans from 1941 to 1944, activity at the Rezbanya mine near Baita ceased until 1949, when a joint Soviet-Rumanian company was formed to redevelop and expand this mine. 114/ In 1949, production at Baita reportedly amounted to 9 tons per day of 85 percent molybdenite concentrate. 115/ Production at this rate would have depleted this deposit in a very short time. Activity at the Maidan mine (45°05' N - 21°44' E), located in the low-grade deposits of the Cerbia-Zam area, was also reported in 1949.

A lack of recent information precludes any estimate of annual production of molybdenum ore. Rumania may not now be producing molybdenum.

2. Ferroalloys.

Rumanian production of ferroalloys is limited to blast furnace ferromanganese produced at Recita and silicomanganese and ferromanganese produced in two electric furnaces at the Diciosanmartin ferroalloy plant (46°20' N - 24°16' E). 116/ In 1955, production of these ferroalloys, estimated at 17,000 tons, is considered to have been adequate to meet Rumanian requirements for making steel.

Rumania is dependent on imports to meet all its other requirements for ferroalloys. The principal source is the USSR, and supplemental shipments come from East Germany and Czechoslovakia. 117/

III. Technology, Productivity of Labor, and Quality.

The Rumanian government has organized technical schools and institutes which include a coal institute at Petroseni; a training center for iron and steel workers at Hunedoara; and a technical school for construction, including steel construction, at Deva (45°53' N - 22°55' E). 118/

The Institute of Metallurgy and Applied Chemistry, a branch of the Academy of Sciences of the Peoples Republic of Rumania, has as its principal objectives the introduction of improved processes of production, the reduction in consumption of high-quality and

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heat-resistant steels, the utilization of available raw materials which are not adaptable to conventional methods of processing, and the modernization of metallurgical plants. 119/ It is assumed that this institute works closely with the Soviet-Rumanian Commission for Scientific and Technical Cooperation, which has an interest in improving metallurgical technology in Rumania. 120/

The level of the blast furnace and steelmaking technology of Rumania is considerably below that of the US, the USSR, and several of the Satellites. The first steps toward equipping blast furnaces with high top pressure and humidity control of blast were taken in August 1956, when Soviet plans and drawings for such equipment were obtained at a meeting of the Soviet-Rumanian Commission. 121/ In 1955, blast furnaces operated with a coefficient of utilization of about 1.46, compared with 0.80 achieved by the USSR in the same year. 122/

Although coefficients of utilization of open hearth furnaces are not available, the Rumanians have openly criticized the inefficient operation of steelmaking furnaces under the First Five Year Plan. An increase of 22 percent in the utilization of steelmaking facilities existing in 1955 is expected under the Second Five Year Plan through the elimination of furnace delays, installation of better refractory materials, and wider use of improved metallurgical practices. 123/

Between 1950 and 1955 the productivity of labor at the Gheorghiu-Dej Combine increased 47.9 percent for the combine as a whole; for blast furnaces, 58.7 percent; for the open hearth shop, 22.8 percent; and for rolling mills, 62.8 percent. 124/ Nevertheless, 20 men are still required to operate a 500-ton-per-day blast furnace at this plant, whereas only 12 men can operate a 2,000-ton-per-day furnace in the USSR or the US. 125/ Increases in the productivity of labor in the iron and steel industry under the Second Five Year Plan are expected through increased mechanization and through specialization of plants to allow longer runs between mill changes. 126/

Although the quality of Rumanian finished steel products has improved since 1952, when rejections on some items were as high as 26 to 28 percent, 127/ the need for further improvement is being emphasized. Poor quality has been attributed to the use of inferior and inadequate raw materials, failure to follow improved technological practices, and faulty management. 128/ Allegedly the failure of management to provide accurate monthly plans for production has resulted in lower quality because of rushes to meet quotas at the end of the month. 129/

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IV. Investment, Costs and Prices, and Wages.

A. Investment.

Gross fixed investment in the ferrous metallurgical industry of Rumania was less than planned in 1951-55, but investment in the petroleum industry was 51 percent greater than planned. ^{130/} The petroleum industry received 15.2 percent of total investment and 28.2 percent of industrial investment, but the ferrous metallurgical industry received only 5.5 percent of total investment and 10.1 percent of industrial investment. Originally the First Five Year Plan had allocated only 9.7 percent of total investment to petroleum and 6.5 percent to ferrous metallurgy. The reduction in investment probably contributed to the failure of the ferrous metallurgical industry to meet a single goal for production in 1955.

Planned and actual investment in the petroleum and ferrous metallurgical industries in 1951-55 and planned investment for 1956-60 are shown in Table 9.

Table 9

Planned and Actual Investment in Industry in Rumania ^{a/}
1951-55 and 1956-60

<u>Sector</u>	<u>1951-55</u>		<u>1956-60 Plan</u>
	<u>Plan</u>	<u>Actual</u>	
Ferrous metallurgy	4.3	3.7	7.2
Petroleum	6.4	10.3	15.3
Other	23.5	22.5	37.5
Total	<u>34.2</u>	<u>36.5</u>	<u>60.0</u>

a. ^{131/}. The official rate of exchange of 6 lei to US \$1 is not necessarily an accurate reflection of the dollar value.

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In 1956-60, investment in the ferrous metallurgical industry is scheduled to be nearly twice that in 1951-55, amounting to 12 percent of total industrial investment. Two billion lei* were to be spent in 1956 to construct an open hearth shop, an electric furnace shop, a blooming mill, and a coke battery at the Gheorghiu-Dej Steel Combine; to finish construction of a seamless tube mill at Roman; and to install a sheet mill at the Christea Nicolae Steel Works. 132/

B. Costs and Prices.

No specific figures on costs of production are available for the iron and steel industry of Rumania, but the costs of producing finished products in the industry are reported to be high because of the high cost and unduly high consumption of raw materials, because of inefficient operations, and because of poor supervision. 133/

Although the Rumanian press has emphasized the necessity of reducing costs, it was reported in mid-1956 that the costs of production in the Ministry of Metallurgy and Machine Building were rising rather than falling. 134/

Wholesale prices for carbon and alloy finished steel products in 1956 were those established by governmental decisions Nos. 324 and 325, issued on 3 and 4 March 1953. These prices have been compared with US base prices in 1956, and leu-dollar ratios have been calculated for individual products.** Because the Rumanian product mix cannot be determined accurately, a weighted average leu-dollar ratio has not been calculated. It is evident, however, that the ratio of all items is greater than the official rate of exchange, ranging from 9.1 to 1 on buttweld pipe to 44.4 to 1 on hot rolled alloy bars. It appears that, in comparison with US pricing practice, the Rumanian industry places a disproportionate premium on items requiring alloys, coating materials, or special finishing.

* The official rate of exchange of 6 lei to US \$1 is not necessarily an accurate reflection of the dollar value.

** For a comparison of the prices in the US and Rumania, see Table 11, Appendix A, p. 31, below.

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C. Wages.

Wages in the Rumanian iron and steel industry are based on the norm system. 135/ On 1 April 1953 a wage system was installed which divided steel workers into three classes, as follows: class 1, Recita and Gheorghiu-Dej workers; class 2, workers at medium-sized plants; and class 3, workers at small plants. Class 1 workers receive 10 percent more pay than class 2 workers and 15 percent more than class 3 workers. Each class contains 12 rate levels, and over-fulfillment of norms is rewarded with the payment of an increased rate within the class. After 5 years of uninterrupted employment, a worker receives an increase of 5 percent of his original base pay. The increment may total 30 percent of his original base pay after 20 years of continuous service. 136/

Basic wages in the Rumanian steel industry in 1955 ranged from 700 to 900 lei per month, 137/ which at the official rate of exchange amounts to about US \$136. The average pay of a Rumanian steelworker is from 100 to 300 lei above the average for all industry. A Rumanian family earning 800 lei per month, however, must spend 550 to 575 lei for food and 200 lei for substandard housing, including utilities, leaving only 50 to 100 lei for all other expenses, including clothing and school expenses of 50 lei for each child. 138/

V. Capabilities, Vulnerabilities, and Intentions.

A. Capabilities.

The iron and steel industry of Rumania is handicapped by inadequate raw materials, inefficient operations, poor management, and high costs. Nevertheless, the industry has managed to supply vitally needed steel which might not have been available elsewhere because of the inadequate supply of steel in the European Satellites since the inauguration of the programs for industrialization.

The ability of the ferrous metallurgical industry of Rumania to meet its goal for 1960 depends to a considerable extent on its ability to construct new facilities, which are to account for almost one half of planned production in 1960, and on the procurement of the essential raw materials, principally through imports. Unless construction of metallurgical facilities improves substantially, it is doubtful whether the goals for 1960 will be achieved.

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B. Vulnerabilities.

The dependence on imported raw materials represents the principal potential vulnerability of the Rumanian iron and steel industry. More than one-half of the required iron ore is obtained from the USSR; almost two-thirds of the metallurgical coke consumed is supplied by the USSR, Czechoslovakia, and Poland. The Second Five Year Plan indicates the continued dependence of Rumania on outside sources for its supply of iron ore and alloying materials.

C. Intentions.

Planned increases in production of iron and steel in Rumania between 1956 and 1960 appear to be designed to meet the requirements of the expanding manufacturing industries and to reduce Rumanian dependence on imports of finished steel, particularly tubular products, for the important petroleum industry.

Direct indications of military intentions are not discernable from an analysis of the Rumanian ferrous metallurgical industry.

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APPENDIX A

STATISTICAL TABLES

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FACILITIES,^{2/} CAPACITY,^{3/} AND ESTIMATED PRODUCTION OF COKE, PIG IRON, CRUDE STEEL, AND FINISHED STEEL IN RUMANIA, 1955

Table 10

PLANT	METALLURGICAL COKE			PIG IRON			CRUDE STEEL			FINISHED STEEL			PRODUCTS				
	NUMBER OF OVENS			FURNACES			ANNUAL CAPACITY (THOUSAND METRIC TONS)			1955 PRODUCTION (THOUSAND METRIC TONS)							
	1955 PRODUCTION (THOUSAND METRIC TONS)			NUMBER			1955 PRODUCTION (THOUSAND METRIC TONS)			TOTAL							
	ANNUAL CAPACITY (THOUSAND METRIC TONS)	1955 PRODUCTION (THOUSAND METRIC TONS)	PER FURNACE (METRIC TONS)	NUMBER	1955 PRODUCTION (THOUSAND METRIC TONS)	ANNUAL CAPACITY (THOUSAND METRIC TONS)	1955 PRODUCTION (THOUSAND METRIC TONS)	OPEN HEARTH	ELECTRIC	TOTAL	1955 PRODUCTION (THOUSAND METRIC TONS)	OPEN HEARTH		ELECTRIC	TOTAL		
CIOCANUL STEEL WORKS MADRAS, 45 38N22 11E	None	None	None	3	None	35 3/4	None	100	45	None	45	None	45	8 1-stand hot sheet mills 3/4 4-stand cold sheet mill 1 rolling strip 3/4 1 foundry 3/4 1 forge 3/4	Hot rolled strip Cold rolled strip In plate Castings Forgings	30 3/4	
COTROCIENI MOTOR VEHICLE REPAIR PLANT MEDIȘIDA, 44 54N28 17E	None	None	None	None	None	None	2	None	None	2 3/4	None	2 3/4	None	1 foundry 3/4 1 forge 3/4	Castings Forgings	1	
CRISTEA NICOLAE STEEL WORKS GRATI, 45 27N28 03E	None	None	None	None	None	None	None	None	None	None	None	None	None	2 hot sheet mills 3/4 1 hot sheet mill 3/4 1 wire mill 3/4 1 rod mill 3/4 1 wire mill 3/4	Hot rolled sheets Cold rolled sheets Wire Bare Wire	23 3/4	
DANUBE METALLURGICAL WORKS BRALIA, 45 16N27 59E	None	None	None	None	None	None	None	None	None	None	None	None	None	1 rod mill 3/4 1 wire mill 3/4	Castings	31	
1 MAX OIL EQUIPMENT PLANT FLOREȘTI, 44 57N26 02E	None	None	None	None	None	None	5	None	None	8 3/4	None	8 3/4	None	1 foundry 3/4 1 forge 3/4	Castings	4	
GHEORGHIU DEJ FOUNDRY TARGOVISTE, 44 58N25 28E	None	None	None	None	None	None	9	None	None	9 3/4	None	9 3/4	None	1 foundry 3/4 1 forge 3/4	Castings Forgings	5	
GHEORGHIU DEJ METALLURGICAL COMBINE HUNEDOARA, 45 46N22 55E	24	200 3/4	50	4	275 3/4	130	10	338 3/4	185 3/4	10	348	185 3/4	10	1 blooming mill 3/4 1 structural mill 3/4 1 bar mill 3/4 1 plate mill 3/4 1 wheel mill 3/4 1 forge 3/4 1 foundry 3/4	Structural shapes Axes Plates Sheets Pipes Forgings Castings	120 3/4	
OTELUL ROSU STEEL PLANT FERONIA, 45 35N22 52E	None	None	None	1	None	30 3/4	None	90	90	None	90	None	90	1 blooming mill 3/4 1 bar mill 3/4 1 hot sheet mill 3/4 1 cold sheet mill 3/4 1 foundry 3/4 1 forge 3/4	Bars Structural shapes Plates Sheets Cold rolled sheets Castings	63	
PROGRESUL RAILROAD EQUIPMENT PLANT BRALIA, 45 16N27 59E	None	None	None	1	None	None	4	18 3/4	None	None	None	None	None	1 foundry 3/4 1 forge 3/4	Castings Forgings	13	
REPUBLICA TUBE WORKS BUCHARREST, 44 25N26 06E	None	None	None	None	None	None	None	None	None	None	None	None	None	2 seamless tube mills 3/4 1 plate mill 3/4	Seamless tubes Plates	80 3/4	
RESTIA METALLURGICAL COMBINE RESTIA, 45 18N27 54E	48	180 3/4	180	2	210 3/4	50 3/4	6	306	275 3/4	11	317	275 3/4	11	1 sheet mill 3/4 1 structural mill 3/4 1 bar mill 3/4 1 wheel mill 3/4 1 foundry 3/4 1 forge 3/4	Structural shapes Rails Bars Axes Wheels Castings and forgings	100 3/4	
SARAI INDUSTRIES FACTORY CAMPANA-TURZU, 45 33N23 52E	None	None	None	1 3/4	None	40	5	40	25	5	45	25	5	2 bar mills 3/4 1 wire mill 3/4	Bars Wire	53 3/4	
STAGIUL ROSU WORKS ORASUL STALIN, 45 38N25 34E	None	None	None	2 3/4	None	15	5	35	23	5	40	23	5	1 structural mill 3/4 1 plate mill 3/4 1 foundry 3/4 1 forge 3/4	Structural shapes Bars Castings Forgings	18	
23 AUGUST WORKS BUCHAREST, 44 25N26 06E	None	None	None	2 3/4	None	24	6	46	35	13	59	35	13	1 foundry 3/4 1 forge 3/4	Castings Forgings	26	
VICTORIA STEEL WORKS CAGAN, 45 44N22 59E	None	None	None	None	75	None	None	None	None	None	None	None	None	None	None	None	None
VLAHUTI IRON WORKS CAGAN, 45 44N22 59E	None	None	None	None	15	None	None	None	None	None	None	None	None	None	None	None	None
VLAHUTI IRON WORKS CAGAN, 45 44N22 59E	None	None	None	None	20	None	None	None	None	None	None	None	None	None	None	None	None
TOTAL	72	380	230	22	575	14	14	973	692	73	1046	692	73	Not applicable	Not applicable	Not applicable	567

^{2/}As of 1 January 1956

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Table 11

Comparison of Rumanian and US Prices of Semifinished
and Finished Steel Products
1956

Product	Rumanian Base Price (Lei per Metric Ton) ^{a/}	US Base Price (Dollars per Metric Ton) ^{b/}	Leu-Dollar Ratio
Blooms, slabs, and billets	1,580	81.62	19.4
Bars (hot rolled, carbon)	2,000	111.90	17.9
Bars (hot rolled, alloy)	6,000	135.06	44.4
Bars (concrete reinforcing)	2,100	111.90	18.8
Bars (cold finished, carbon)	4,150	151.04	27.5
Structural shapes (carbon)	1,750	110.25	15.9
Sheets (hot rolled, carbon)	1,900	103.08	18.4
Sheets (hot rolled, gal- vanized carbon)	5,000	138.92	36.0
Strip (hot rolled, carbon)	2,000	103.08	19.4
Strip (cold rolled, carbon)	2,900	192.94	15.0
Blackplate	1,900	157.66	12.0
Tinplate	4,350	235.20	18.5
Electrical sheets	6,750	242.55	27.8
Plates	2,000	106.94	18.7
Rails (standard)	2,050	111.90	18.3
Rail joint bars	2,650	140.02	18.9
Wire	1,900	163.08	11.7
Buttweld pipe (1/2-inch, black)	2,500	275.63	9.1
Buttweld pipe (1/2-inch, galvanized)	4,400	336.26	13.1

a. $\frac{180}{100}$

b. $\frac{181}{100}$. US base prices were reported in cents per pound and were converted to dollars per metric ton by multiplying by 22.05.

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APPENDIX B

METHODOLOGY

Where feasible, methodology has been shown in the text and in the tables. Other specific methods and some general applications are discussed in this appendix.

1. Pig Iron Capacity and Production.

The daily capacity of each blast furnace was given. Annual capacity and production were derived as follows:

Normal annual operating time = 340 days

Annual capacity = daily capacity x 340

Annual production = $\frac{\text{daily capacity of blast furnaces} \times 340}{\text{coefficient of utilization}}$

2. Interpolation of Production in 1956.

Estimates of production in 1956 were based on reported production in 1955 and the announced goal for 1960, using the compound interest formula.

$$\frac{A}{B} = (1 + r)^n$$

where

A = goal for 1960

B = production in 1955

r = rate of annual increase

n = number of years

3. Foreign Trade Statistics.

Annual estimates of foreign trade in specific commodities in some cases were compiled from a large number of miscellaneous documents

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including reports of border shipments and water shipments and State Department economic despatches.

4. Crude Steel Capacity.

Estimated annual crude steel capacity as given in this report is theoretical capacity based on the size of each furnace in tons per melt, which was known in each case, and the number of melts per day that could be produced at the Soviet level of technology times 325 working days per year.

5. Production of Finished Steel at Individual Plants.

Documented information was available for estimating production of finished steel in 1955 at plants which produced 72 percent of the officially announced production of 567,000 tons. The remaining 28 percent was divided among the other producers of finished steel, taking into account the production of crude steel and the type of products produced at each plant.

6. Estimated Balance of Scrap and Pig Iron in 1955.

	<u>Amount</u> <u>(Metric Tons)</u>
a. <u>Requirements.</u>	
For production of crude steel (765,000 x 1.1*)	840,000
For production of iron castings	160,000
Total	<u>1,000,000</u>
b. <u>Supply.</u>	
Scrap from processing steel ingots and castings (765,000 x 0.26)	200,000
Scrap from fabrication of domestically produced rolled steel (567,000 x 0.15**)	85,000
Scrap from fabrication of imported finished steel (236,000 x 0.15**)	35,000

* To account for the metallics lost in melting, which may vary from 8 to 21 percent.

** Based on the normal yield of scrap from fabricating finished steel in the US.

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	<u>Amount</u> <u>(Metric Tons)</u>
b. <u>Supply</u> (Continued).	
Iron scrap from production of iron castings (160,000 melt tons x 0.37*)	60,000
Pig iron (total production in 1955)	575,000
Total**	<u>955,000</u>
c. <u>Balance</u> .	
Requirements	1,000,000
Supply	955,000
Deficit	45,000

This deficit could have been offset by local scrap drives.

* Based on the normal yield of 63 percent from poured metal to finished iron castings in the US.

** Excludes scrap which may have been accumulated by scrap drives.

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APPENDIX C

GAPS IN INTELLIGENCE

Information on the Rumanian ferrous metallurgical industry is inadequate to permit a comprehensive assessment of its economic and physical strengths and weaknesses. Specific gaps in intelligence are listed below.

1. Data are not available on the following:
 - a. The product mix of finished steel, including a division between carbon and alloy steels.
 - b. The patterns of distribution and consumption of finished steel products.
 - c. Costs of production and manufacture in the iron and steel industry.
2. Available information on some individual steel plants is vague and fragmentary. No coefficients of utilization of open hearth furnaces are available.
3. There is no reliable information which could be used to relate production of the ferrous metallurgical industry or of the iron and steel industry to the gross national product of Rumania.
4. Although representative base prices of finished steel products are available, similar data on the raw and alloying materials required to produce the finished steel products are not available.
5. Information concerning technology, quality, and specifications related to the iron and steel industry is limited.
6. Trade data on all segments of the ferrous metallurgical industry are limited.

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APPENDIX D

SOURCE REFERENCES

In evaluating the performance of the Rumanian ferrous metallurgical industry under the First Five Year Plan, UN publications, State Department despatches, and FDD translations were the most helpful sources of information. In determining the goals of the Second Five Year Plan for the industry and analyzing the means by which these goals are to be achieved, reliance was placed mainly on FBIS publications and FDD translations. Foreign intelligence surveys and publications were of assistance in describing reserves of raw materials and alloying materials. In studying iron and steel plants, Air Force reports were used more widely than any others.

Evaluations, following the classification entry and designated "Eval.," have the following significance:

<u>Source of Information</u>	<u>Information</u>
Doc. - Documentary	1 - Confirmed by other sources
A - Completely reliable	2 - Probably true
B - Usually reliable	3 - Possibly true
C - Fairly reliable	4 - Doubtful
D - Not usually reliable	5 - Probably false
E - Not reliable	6 - Cannot be judged
F - Cannot be judged	

"Documentary" refers to original documents of foreign governments and organizations; copies or translations of such documents by a staff officer; or information extracted from such documents by a staff officer, all of which may carry the field evaluation "Documentary."

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Evaluations not otherwise designated are those appearing on the cited document; those designated "RR" are by the author of this report. No "RR" evaluation is given when the author agrees with the evaluation on the cited document.

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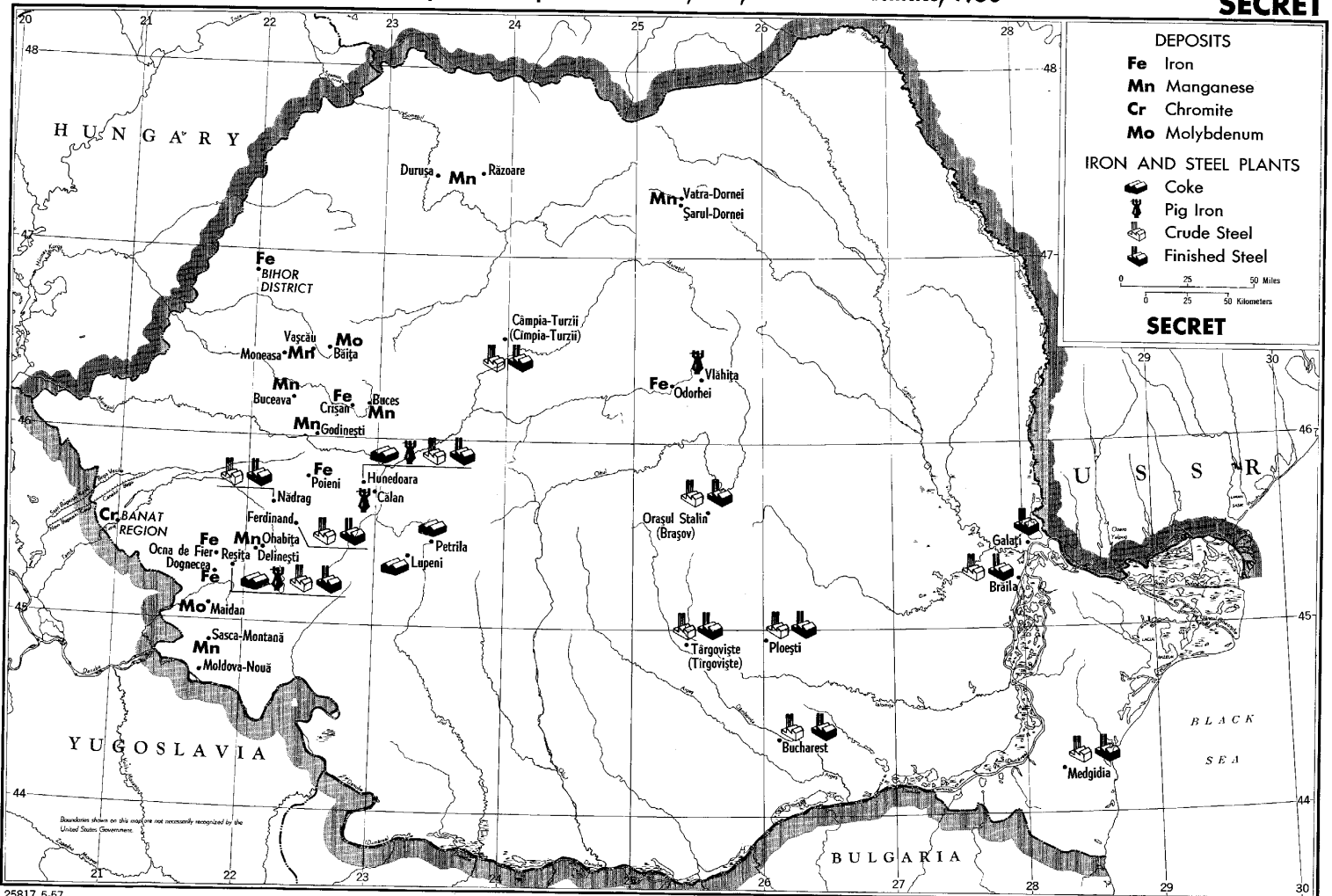
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