~~CONFIDENTIAL~~

~~S-E-C-R-E-T~~

2

~~U.S. OFFICIALS ONLY~~

PROVISIONAL INTELLIGENCE REPORT

PLANT STUDY OF THE IRON AND STEEL INDUSTRY OF THE USSR: ECONOMIC REGION III

CIA/RR PR-69

(ORR Project 23.176)

27 August 1954

NOTICE

The data and conclusions contained in this report do not necessarily represent the final position of ORR and should be regarded as provisional only and subject to revision. Comments and additional data which may be available to the user are solicited.

WARNING

THIS DOCUMENT CONTAINS INFORMATION AFFECTING THE NATIONAL DEFENSE OF THE UNITED STATES WITHIN THE MEANING OF THE ESPIONAGE LAWS, TITLE 18, USC, SECS. 793 AND 794, THE TRANSMISSION OR REVELATION OF WHICH IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PROHIBITED BY LAW.

CENTRAL INTELLIGENCE AGENCY

Office of Research and Reports

~~CONFIDENTIAL~~

~~S-E-C-R-E-T~~

~~U.S. OFFICIALS ONLY~~

Approved For Release 1999/09/02 : CIA-RDP79-01093A000600010003-9

FOREWORD

This report covers those plants in Economic Region III which produce metallurgical coke, pig iron, and steel ingots, as well as steel castings and other types of finished steel. Region III is one of the 2 most important steel-producing regions in the USSR, accounting for 51.1 percent of the metallurgical coke, 54.8 percent of the pig iron, 29.1 percent of the steel, and 29 percent of the finished steel produced in the USSR. The industry is centralized in two industrial concentrations: (a) the Middle Dnepr, including parts of the Dnepropetrovsk and Zaporozh'ye Oblasts, and (b) the Donets Basin, including most of Stalino Oblast and the southern part of Voroshilovgrad Oblast. The entire peacetime economy of the USSR is integrated closely with the industry of this region. Although it contributed little during World War II, the region has the potentiality of becoming a source of vast quantities of materiel if the need arises.

The primary intelligence value of this report lies in the basic evaluation of the plant capacity of this region as a contribution to the capabilities of the USSR in the production of metallurgical coke, pig iron, steel, and finished steel products. The localization of industrial centers and individual plants and the evaluation of their importance in the Soviet iron and steel industry furnish valuable target information. Regional production estimates of the Soviet iron and steel industry also serve as a check on Soviet statistics.

This report is one of a series of regional provisional reports that will provide basic research data for a comprehensive study which is to be made on the iron and steel industry of the USSR.

CONTENTS

	Page
Summary	1
I. Stalino Oblast	13
A. Zhdanov Complex	27
1. Azovstal Metallurgical Plant imeni Sergo Ordzhonikidze	27
2. Il'ich Steel Plant	45
B. Makeyevka Complex	61
3. Makeyevka Metallurgical Plant imeni Sergei M. Kirov	61
4. Novo Makeyevka Coke-Chemical Plant No. 4	76
5. Staro Makeyevka Coke-Chemical Plant No. 5	79
C. Stalino Complex	81
6. Chumakovo Coke-Chemical Plant	81
7. Mushketovo Coke-Chemical Plant No. 9	82
8. Novo Smol'yaninov Coke-Chemical Plant	85
9. Rutchenkovo Coke-Chemical Plant No. 2 imeni Kirov	87
10. Stalino Iron and Steel Works imeni I.V. Stalin	90
D. Kramatorsk Complex	102
11. Khartsyzsk Pipe Plant	102
12. Kramatorsk Metallurgical Plant imeni Kuybyshev	105
13. Novo-Kramatorsk Machinery Building Plant imeni I.V.Stalin	113
14. Staro-Kramatorsk Machinery Building Plant imeni Ordzhonikidze	119
E. Gorlovka Complex	122
15. Kirov Machine Plant	122

Page

16. Novo Gorlovka Coke-Chemical Plant No. 3 imeni Koksakhim 124

F. Konstantinovka Complex 126

17. Konstantinovka Coke-Chemical Plant No. 17 126
18. Konstantinovka Metallurgical Plant imeni Frunze . . 129

G. Single Plants 139

19. Debal'tsevo Steel Foundry 139
20. Nikitovka Coke-Chemical Plant 141
21. Shcherbinovka Coke-Chemical Plant No. 11 144
22. Toretsk Machinery Factory imeni Voroshilov 145
23. Yenakiyevo Metallurgical Plant imeni Ordzhonikidze . 149

II. Voroshilovgrad Oblast 165

24. Almaznaya Iron Works 171
25. Bryanskiy Coke-Chemical Plant No. 14 174
26. Irmino Coke-Chemical Plant 176
27. Kadiyevka Coke-Chemical Plant 178
28. October Revolution Locomotive Plant 181
29. Olkhovsk Coke-Chemical Plant No. 12 186
30. Parkhomenko Heavy Machinery Building Plant 188
31. Voroshilovgrad Pipe Rolling Mill imeni Yakubovski . 191
32. Voroshilovsk Metallurgical Works imeni Voroshilov . 194

III. Dnepropetrovsk Oblast 203

A. Dnepropetrovsk Complex 212

33. Dnepropetrovsk Coke-Chemical Plant No. 20 imeni Kalinin 212
34. Dnepropetrovsk Metallurgical Equipment Plant DZMO imeni Khatayevich 215
35. Dnepropetrovsk Pipe Rolling Mill imeni Lenin 223
36. Komintern Steel Combine 234
37. Nizhnedneprovsk Metallurgical Plant and Tube Mill imeni Karl Liebknecht 246
38. Nizhnedneprovsk Wire and Nail Plant 258

Page

39. Petrovski Metallurgical Plant 262
40. Spartak Metal Goods Factory 281

B. Dneprodzerzhinsk Complex 283

41. Dneprodzerzhinsk Coke-Chemical Plant imeni Kamen . . 283
42. Dneprodzerzhinsk Coke-Chemical Plant No. 24 imeni Ordzhonikidze 285
43. Dneprodzerzhinsk Metallurgical Plant imeni Dzerzhinski 288

C. Single Plants 302

44. Krivoy Rog Metallurgical Plant imeni Stalin 302
45. Nikopol' Pipe and Tube Mill 320
46. Novomoskovsk Sheet Mill 327

IV. Zaporozh'ye Oblast 331

47. Zaporozh'ye Metallurgical Combine imeni Sergo Ordzhonikidze 333

V. Odessa Oblast: Odessa Complex 357

48. October Revolution Agricultural Equipment Plant . . . 359
49. Odessa Rolling Mill imeni Dzerzhinski 361
50. Odessa Wire and Nail Factory imeni Ivanov 363
51. Pervomaysk Metallurgical Plant imeni 25th Oktyabr . . 365

VI. Nikolayev Oblast: Nikolayev Complex 368

52. Dormashina Tractor Plant 369
53. Marti Shipbuilding Yard No. 444 imeni Andre Marti . . 371

VII. Khar'kov Oblast: Khar'kov Complex 377

54. Khar'kov Experimental Coke-Chemical Plant No. 26 . . 378
55. Khar'kov Locomotive and Tank Plant imeni Komintern 380

Page

VIII. Crimea Oblast: Kerch' Complex 384

56. Kerch' Coke-Chemical Plant imeni Kirov 385
57. Kerch' Metallurgical Plant imeni Voykov 388

Appendixes

Appendix A. Methodology 393

Appendix B. Gaps in Intelligence 395

Appendix C. Sources and Evaluation of Sources 397

Tables

1. Estimated Production and Percent of Total Soviet Production of Iron and Steel in Region III of the USSR, 1953 2

2. National and Regional Shares of Production of Iron and Steel in 2 Areas of Region III of the USSR, 1953 2

3. Estimated Production of the Iron and Steel Industry by Oblast in Region III of the USSR, 1953 5

4. Estimated Plant Production of Iron and Steel by Oblast in Region III of the USSR, 1953 7

Map

USSR: Economic Region III, Iron and Steel Plants, . . . Inside Back Cover

CIA/RR PR-69
(ORR Project 23.176)

S-E-C-R-E-T

PLANT STUDY OF THE IRON AND STEEL INDUSTRY OF THE USSR: ECONOMIC REGION III*

Summary

Economic Region III** consists of the Ukrainian SSR and the Moldavian SSR; however, there is no iron and steel industry in Moldavia. The Ukraine industry produces over one-third of the metallurgical coke and pig iron and approximately one-third of the steel supply of the USSR. Before World War II it was the most productive region of the Soviet Union, but at the present time it is second to the fast-growing Urals in the output of steel and semifinished steel products. The large yield of metallurgical coke and pig iron not only supplies consumers in the Ukraine but also supplements the coke oven and blast furnace production of other steel-producing regions of the country.

The Ukraine iron and steel industry is based firmly on large reserves of raw materials within the area. Abundant quantities of coking coal are available in the Donets Basin, there is a large supply of iron ore in the Krivoy Rog and Kerch' regions, the Nikopol' manganese deposits are nearby, and there is an ample supply of limestone and dolomite within easy access to all plants. Region III has a good rail transportation system, supplemented by some water transportation on the Donets and Dnepr Rivers, the Black Sea, and the Sea of Azov; over this network raw materials are moved to the plants and finished steel products are distributed to the consuming industries of the USSR.***

Table 1**** contains the estimated 1953 production of metallurgical coke, pig iron, steel, and finished steel in the Ukraine. It also shows the region's share of Soviet production for those commodities.

The largest iron- and steel-producing area in Region III is in the Donets Basin and includes the adjoining oblasts of Stalino and Voroshilovgrad. The Middle Dnepr is the second largest concentration

* The estimates and conclusions contained in this report represent the best judgment of the responsible analyst as of 1 Feb 1954.

** The term region in this report refers to the economic regions defined and numbered on CIA Map 12084, 9-51, USSR: Economic Regions.

*** See the map, USSR: Economic Region III, Iron and Steel Plants, inside back cover.

**** Table 1 follows on p. 2.

Table 1

Estimated Production and Percent of Total Soviet Production of Iron and Steel in Region III of the USSR 1953

Product	Region III Production (Thousand MT)	Soviet Production (Thousand MT)	Percent of Total Soviet Production
Metallurgical Coke	17,905.0	35,000.0	51.1
Pig Iron	15,018.5	27,400.0	54.8
Steel	10,980.1	37,700.0	29.1
Finished Steel	8,016.9	27,600.0	29.0

and is composed of Dnepropetrovsk and Zaporozh'ye Oblasts. Table 2 shows national and regional shares of production of each of these two areas. There are minor steel industries in Odessa, Nikolayev, and Khar'kov Oblasts.

Table 2

National and Regional Shares of Production of Iron and Steel in 2 Areas of Region III of the USSR 1953*

Percent

Area	Metallurgical Coke	Pig Iron	Steel	Finished Steel
Donets Basin (Stalino and Voroshilovgrad Oblasts)				
National Share	32.9	31.1	14.2	14.5
Regional Share	54.4	56.9	50.2	50.3

* Table 2 continues on p. 3.

Table 2

National and Regional Shares of Production of Iron and Steel in 2 Areas of Region III of the USSR
1953
(Continued)

Percent

Area	Metallurgical Coke	Pig Iron	Steel	Finished Steel
Middle Dnepr (Dnepropetrovsk and Zaporozh'ye Oblasts)				
National Share	15.5	23.7	13.9	14.4
Regional Share	30.2	53.1	47.7	47.4

With the nationalization of industry by the Soviet government following the Russian Revolution, the Ukraine became the nucleus for the expansion of the iron and steel industry so necessary for the planned industrialization of the USSR. The expansion of Ukrainian industry was made one of the primary targets of the First Five Year Plan (1928-32), which provided for the acceleration of the production of raw materials, the construction of new coke-chemical plants and steel plants, and the expansion and modernization of existing plants with the addition of new blast furnaces, open hearths, electric furnaces, and finishing facilities. Before World War II the Ukraine was the largest iron and steel producing region of the USSR.

Upon the threat of the German advance into the area in the spring of 1941, the USSR systematically destroyed iron and steel facilities. Coal and iron mines were flooded, plant equipment was largely evacuated or destroyed, and heats were allowed to freeze in furnaces. Only a few plants were left in a semiworking condition. German occupation of the area began in the summer of 1941 and continued for over 2 years. The plan of the Reich to operate an industry in the Ukraine to supplement German production in support of the war effort was a complete failure. Soviet destruction was never repaired, and the Germans were never able to allocate enough equipment from their own supply to replace that which had been evacuated by the USSR. With the German retreat in 1943, further stripping of equipment from plants took place, and a large part of the existing structures was dynamited.

The USSR at once began the gigantic task of rebuilding the steel industry of Region III. Thousands of Soviet workers and prisoners of war were put to work at clearing rubble and rebuilding structures. Some of the equipment evacuated by the USSR was returned and installed, furnaces were reconstructed and reinstalled, and new facilities were added. Prewar plants for the most part were rebuilt to former sizes and capacities. Reconstruction was complete by the end of 1949, and it was claimed that production was back to prewar levels. Some new plants were built and some new installations were added to existing structures. No attempt, however, was made to expand the plants to the sizes contemplated in the prewar five year plans.

The operating efficiency of plants was improved in the postwar years by the modernization and mechanization of equipment, the introduction of new working techniques, and by improving the skill of workers through extensive training programs in most of the plants.

Table 3* shows the estimated 1953 production of metallurgical coke, pig iron, steel, and finished steel in each of the oblasts of Region III which contain plants, and the share of each oblast of USSR production and of regional production.

Table 4** lists 1953 production of metallurgical coke, pig iron, steel, and finished products by political division and by complex or single plant within the division.

Production in 1951, 1952, and 1953 for metallurgical coke, pig iron, steel, and finished steel has exceeded outputs of the preceding years. Early in 1954 it was announced that the Ministry of Ferrous Metallurgy as a whole had not reached its planned outputs and that some of the larger plants in the Ukraine, among which were Azovstal Metallurgical Plant and Dneprodzerzhinsk Metallurgical Plant, had not achieved their planned targets.

Failure of these plants to reach planned production targets may have been the reason for the establishment of a new organization in the Ukraine. On 8 February 1954 the Kremlin announced that a Union Republic Ministry of Ferrous Metallurgy in the Ukraine SSR was being formed. It is probable that the purpose of this organization is the closer supervision of the iron and steel industry in order to secure the accomplishment of production targets. It is possible, however, that the function

* Table 3 follows on p. 5.
** Table 4 follows on p. 7.

Table 3

Estimated Production of the Iron and Steel Industry
by Oblast in Region III of the USSR
1953

Oblast	Metallurgical Coke	Pig Iron	Steel	Finished Steel
Stalino (Thousand MT)	8,722.5	7,295.7	5,367.1	3,822.4
National Share (Percent)	24.9	26.6	14.2	13.9
Regional Share (Percent)	48.8	48.6	48.9	47.7
Voroshilovgrad (Thousand MT)	2,800.0	1,242.1	153.3	203.4
National Share (Percent)	8.0	4.5	Negligible	0.6
Regional Share (Percent)	15.6	8.3	1.3	2.6
Dnepropetrovsk (Thousand MT)	3,220.0	4,850.3	4,041.3	2,948.6
National Share (Percent)	9.2	17.7	10.8	10.7
Regional Share (Percent)	18.0	32.3	36.9	36.8
Zaporozh'ye (Thousand MT)	2,187.5	1,630.4	1,180.7	850.1
National Share (Percent)	6.3	6.0	3.1	3.7
Regional Share (Percent)	12.2	10.8	10.8	10.6

Table 3

Estimated Production of the Iron and Steel Industry
by Oblast in Region III of the USSR
1953
(Continued)

Area	Metallurgical Coke	Pig Iron	Steel	Finished Steel
Odessa (Thousand MT)			34.0	81.3
National Share (Percent)			Negligible	Negligible
Regional Share (Percent)			0.3	1.0
Nikolayev (Thousand MT)			138.0	75.0
National Share (Percent)			Negligible	Negligible
Regional Share (Percent)			1.3	0.9
Khar'kov (Thousand MT)	N.A.		65.7	36.1
National Share (Percent)	N.A.		Negligible	Negligible
Regional Share (Percent)	N.A.		0.5	0.4
Crimea (Thousand MT)	975.0			N.A.
National Share (Percent)	2.7			
Regional Share (Percent)	5.4			
Total (Thousand MT)	17,905.0	15,018.5	10,980.1	8,016.9

Table 4

Estimated Plant Production of Iron and Steel by Oblast in Region III of the USSR
1953

Thousand Metric Tons

Complex or Plant	Metallurgical Coke	Pig Iron	Steel	Finished Steel
Stalino Oblast				
Zhdanov Complex:				
1. Azovstal Metallurgical Plant imeni Sergo Ordzhonikidze	1,700.00	2,449.2	1,383.1	995.8
2. Il'ich Steel Plant		408.0	654.0	470.0
Makeyevka Complex:				
3. Makeyevka Metallurgical Plant imeni Sergei M. Kirov		1,656.4	1,320.4	950.6
4. Novo Makeyevka Coke-Chemical Plant No. 4	1,100.0			
5. Staro Makeyevka Coke-Chemical Plant No. 5	400.0			
Stalino Complex:				
6. Chumakovo Coke-Chemical Plant	N.A.			
7. Mushketovo Coke-Chemical Plant No. 9	150.0			
8. Novo Smol'yaninov Coke-Chemical Plant	640.0			
9. Rutchenkovo Coke-Chemical Plant No. 2 imeni Kirov	1,100.0			
10. Stalino Iron and Steel Works imeni I.V. Stalin	300.0	907.6	576.0	414.7

Approved For Release 1999/09/02 : CIA-RDP79-01093A000600010003-9

Table 4

Estimated Plant Production of Iron and Steel by Oblast in Region III of the USSR
1953
(Continued)

Thousand Metric Tons

Complex or Plant	Metallurgical Coke	Pig Iron	Steel	Finished Steel
Stalino Oblast (Continued)				
Kramatorsk Complex:				
11. Khartsyzsk Pipe Plant				20.0
12. Kramatorsk Metallurgical Plant imeni Kuybyshev	132.5	517.1	276.8	199.3
13. Novo-Kramatorsk Machinery Building Plant imeni I.V. Stalin			250.6	137.8
14. Staro-Kramatorsk Machinery Building Plant imeni Ordzhonikidze			24.0	13.2
Gorlovka Complex:				
15. Kirov Machine Plant			62.0	
16. Novo Gorlovka Coke-Chemical Plant No. 3, imeni Koksokhim	1,450.0			
Konstantinovka Complex:				
17. Konstantinovka Coke-Chemical Plant No. 17	300.0			
18. Konstantinovka Metallurgical Plant imeni Frunze		260.1	245.9	177.0
Single Plants:				
19. Debal'tsevo Steel Foundry			14.6	8.0
20. Nikitovka Coke-Chemical Plant	150.0			
21. Shcherbinovka Coke-Chemical Plant No. 11	N.A.			

Approved For Release 1999/09/02 : CIA-RDP79-01093A000600010003-9

Table 4

Estimated Plant Production of Iron and Steel by Oblast in Region III of the USSR
1953
(Continued)

Thousand Metric Tons

Complex or Plant	Metallurgical Coke	Pig Iron	Steel	Finished Steel
Stalino Oblast (Continued)				
Single Plants: (Continued)				
22. Toretsk Machine Factory imeni Voroshilov			96.4	53.0
23. Yenakiyevo Metallurgical Plant imeni Ordzhonikidze	1,300.0	1,097.3	463.3	383.0
Total	8,722.5	7,295.7	5,367.1	3,822.4
Voroshilovgrad Oblast				
24. Almaznaya Iron Works		279.5		
25. Bryanskiy Coke-Chemical Plant No. 14	300.0			
26. Irmino Coke-Chemical Plant	N.A.			
27. Kadiyevka Coke-Chemical Plant	1,000.0			
28. October Revolution Locomotive Plant			115.8	83.4
29. Olkhovsk Coke-Chemical Plant No. 12	500.0			
30. Parkhomenko Heavy Machinery Building Plant			37.5	20.0
31. Voroshilovgrad Pipe Rolling Mill imeni Yakubovski				100.0
32. Voroshilovsk Metallurgical Works imeni Voroshilov	1,000.0	962.6		
Total	2,800.0	1,242.1	153.3	203.4

Approved For Release 1999/09/02 : CIA-RDP79-01093A000600010003-9

Table 4

Estimated Plant Production of Iron and Steel by Oblast in Region III of the USSR
1953
(Continued)

Thousand Metric Tons

Complex or Plant	Metallurgical Coke	Pig Iron	Steel	Finished Steel
Dnepropetrovsk Oblast				
Dnepropetrovsk Complex:				
33. Dnepropetrovsk Coke-Chemical Plant No. 20 imeni Kalinin	940.0			
34. Dnepropetrovsk Metallurgical Equipment Plant DZMO imeni Khatayevich			55.8	30.6
35. Dnepropetrovsk Pipe Rolling Mill imeni Lenin			325.6	224.4
36. Komintern Steel Combine			126.5	92.0
37. Nizhnedneprovsk Metallurgical Plant and Tube Mill imeni Karl Liebknecht			451.9	325.3
38. Nizhnedneprovsk Wire and Nail Plant				145.0
39. Petrovski Metallurgical Plant		1,087.7	655.5	472.0
40. Spartak Metal Goods Factory				N.A.
41. Dneprodzerzhinsk Coke-Chemical Plant imeni Kamen	N.A.			
42. Dneprodzerzhinsk Coke-Chemical Plant No. 24 imeni Ordzhonikidze	1,400.0			
43. Dneprodzerzhinsk Metallurgical Plant imeni Dzerzhinski		2,574.9	1,763.0	1,269.3
Single Plants:				
44. Krivoy Rog Metallurgical Plant imeni Stalin	880.0	1,187.7	660.0	
45. Nikopol' Pipe and Tube Mill			3.0	90.0
46. Novomoskovsk Sheet Mill				300.0
Total	3,220.0	4,850.3	4,041.3	2,948.6

Table 4

Estimated Plant Production of Iron and Steel by Oblast in Region III of the USSR
1953
(Continued)

Thousand Metric Tons

Complex or Plant	Metallurgical Coke	Pig Iron	Steel	Finished Steel
Zaporozh'ye Oblast				
47. Zaporozh'ye Metallurgical Combine imeni Sergo Ordzhonikidze	2,187.5	1,630.4	1,180.7	850.1
Total	2,187.5	1,630.4	1,180.7	850.1
Odessa Oblast				
Odessa Complex:				
48. October Revolution Agricultural Equipment Plant			22.5	15.0
49. Odessa Rolling Mill imeni Dzerzhinski				60.0
50. Odessa Wire and Nail Factory imeni A. Ivanov				N.A.
51. Pervomaysk Metallurgical Plant imeni 25th Oktyabr			11.5	6.3
Total			34.0	81.3
Nikolayev Oblast				
Nikolayev Oblast				
52. Dormashina Tractor Plant			3.0	N.A.
53. Marti Shipbuilding Yard No. 444 imeni Andrei Marti			135.0	75.0
Total			138.0	75.0

Table 4

Estimated Plant Production of Iron and Steel by Oblast in Region III of the USSR
1953
(Continued)

Thousand Metric Tons

Complex or Plant	Metallurgical Coke	Pig Iron	Steel	Finished Steel
Khar'kov Oblast				
Khar'kov Complex:				
54. Khar'kov Experimental Coke-Chemical Plant No. 26	N.A.			
55. Khar'kov Locomotive and Tank Plant imeni Komintern			65.7	36.1
Total			65.7	36.1
Crimea Oblast				
Kerch' Complex:				
56. Kerch' Coke-Chemical Plant imeni Kirov	275.0			N.A.
57. Kerch' Metallurgical Plant, imeni Voykov	700.0			N.A.
Total	975.0			

Approved For Release 1999/09/02 : CIA-RDP79-01093A000600010003-9

of the new ministry is of a larger order. With the realization that no area in the USSR -- not even the Urals -- is safe from modern air warfare, a decision may have been made in the Kremlin to develop the Ukraine, with its wealth of raw materials, efficient transportation system, and wide range of fabricating plants, into the No. 1 steel-producing area of the USSR, the position it held before World War II.

I. Stalino Oblast.

Stalino Oblast is one of the largest and most important producers of iron and steel in the USSR.

Estimated 1953 Production of Stalino Oblast

	Metallurgical Coke	Pig Iron	Steel	Finished Steel
Total Production (Thousand MT)	8,722.5	7,295.7	5,367.1	3,822.4
National Share (Percent)	24.0	25.7	13.6	13.5
Regional Share (Percent)	47.1	46.8	44.1	45.5

There are six steel complexes within Stalino Oblast. The largest of these is the Zhdanov Complex, which contains the largest integrated steel plant in Region III, the Azovstal Metallurgical Plant.

The Makeyevka Complex contains the important Makeyevka Metallurgical Plant imeni Sergei M. Kirov, which produces pig iron, steel, and finished steel, but which has no coke facilities. Adjacent to the Makeyevka plant are the Novo Makeyevka and Staro Makeyevka Coke-Chemical Plants, which, though not under the same management as the metallurgical plant, supply it with coke and make the complex an integrated unit.

The Stalino Complex is a large producer of metallurgical coke, containing five coke-chemical plants, which not only supply the needs of the Stalino Iron and Steel Works imeni I.V. Stalin, but also furnish a

Approved For Release 1999/09/02 : CIA-RDP79-01093A000600010003-9

surplus for shipment to other consumers in the Ukraine and to other steel producing areas of the USSR.

The Kramatorsk Complex is self-sufficient, except for metallurgical coke. Coke inputs are shipped into the area from other coke-chemical plants in the Ukraine. There are two important machinery building plants in the complex, Novo-Kramatorsk imeni I.V. Stalin, and Staro-Kramatorsk imeni Ordzhonikidze.

The Gorlovka Complex has a large coke-chemical plant, Novo Gorlovka imeni Koksakhim, the production of which is consumed outside of the Gorlovka area.

Among the single plants in Stalino Oblast is the important Yenakiyevo Metallurgical Plant imeni Ordzhonikidze, which is a completely integrated steel plant.

Summary Tables -- Stalino Oblast

1. Production and Capacity
Azovstal Metallurgical Plant imeni Sergo Ordzhonikidze
1953

	Thousand Metric Tons
Metallurgical Coke Production	
4 Batteries - 276 Ovens	1,700.0
Pig Iron Production	
6 Blast Furnaces (BF's)	2,449.2
Steel Production	
9 Open-Hearth Furnaces (OH's) and 2 Electrics	1,383.1
Rolling Mill Capacities	
Blooming Mill	1,000.0
Rail and Structural Mill	700.0

Approved For Release 1999/09/02 : CIA-RDP79-01093A000600010003-9

1. Production and Capacity
Azovstal Metallurgical Plant imeni Sergo Ordzhonikidze
1953
(Continued)

	Thousand Metric Tons
Finished Steel Production	995.8
Power Plant Capacity	N.A.

2. Production and Capacity
Il'ich Steel Plant
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	
2 BF's	408.0
Steel Production	
17 OH's and 1 Electric	654.0
Rolling Mill Capacities	N.A.
Finished Steel Production	470.0
Power Plant Capacity	N.A.

3. Production and Capacity
Makeyevka Metallurgical Plant
imeni Sergei M. Kirov
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	
4 BF's	1,656.4

3. Production and Capacity
Makeyevka Metallurgical Plant
imeni Sergei M. Kirov
1953
(Continued)

	Thousand Metric Tons
Steel Production	
13 OH's and 2 Converters	1,320.4
Rolled Steel Capacities	
1,150-mm Blooming Mill	1,000.0
600-mm Billet Mill	N.A.
660/630-mm Bar Mill	N.A.
630/600-mm Bar Mill	N.A.
450/850-mm Continuous Mill	N.A.
850-mm Rail Structural Mill	N.A.
250/350-mm Wire Mill	N.A.
Finished Steel Production	950.6
Power Plant Capacity	25,000 kw

4. Production and Capacity
Novo Makeyevka Coke-Chemical Plant No. 4
1953

	Thousand Metric Tons
Metallurgical Coke Production	
4 Batteries -- 184 Ovens	1,100.0
Pig Iron Production	0
Steel Production	0
Rolling Mill Capacity	0
Finished Steel Production	0
Power Plant Capacity	N.A.

5. Production and Capacity
Staro Makeyevka Coke-Chemical Plant No. 5
1953

	Thousand Metric Tons
Metallurgical Coke Production	
4 Batteries - 242 Ovens	400.0
Pig Iron Production	0
Steel Production	0
Rolling Mill Capacity	0
Finished Steel Production	0
Power Plant Capacity	N.A.

6. Production and Capacity
Chumakovo Coke-Chemical Plant
1953

	Thousand Metric Tons
Metallurgical Coke Production	N.A.
Pig Iron Production	0
Steel Production	0
Rolling Mill Capacity	0
Finished Steel Production	0
Power Plant Capacity	N.A.

7. Production and Capacity
Mushketovo Coke-Chemical Plant No. 9
1953

	Thousand Metric Tons
Metallurgical Coke Production	
2 Batteries - 76 Ovens	150.0
Pig Iron Production	0
Steel Production	0
Rolling Mill Capacity	0
Finished Steel Production	0
Power Plant Capacity	N.A.

8. Production and Capacity
Novo Smol'yaninov Coke-Chemical Plant
1953

	Thousand Metric Tons
Metallurgical Coke Production	640.0
4 Batteries - 190 Ovens	
Pig Iron Production	0
Steel Production	0
Rolling Mill Capacity	0
Finished Steel Production	0
Power Plant Capacity	N.A.

9. Production and Capacity
Rutchenkovo Coke-Chemical Plant No. 2
imeni Kirov
1953

	Thousand Metric Tons
Metallurgical Coke Production	
7 Batteries - 282 Ovens	1,100.0
Pig Iron Production	0
Steel Production	0
Rolling Mill Capacity	0
Finished Steel Production	0
Power Plant Capacity	0

10. Production and Capacity
Stalino Iron and Steel Works
imeni I.V. Stalin
1953

	Thousand Metric Tons
Metallurgical Coke Production	300.0
1 Battery - 47 Ovens	
Pig Iron Production	
4 BF's	907.6
Steel Production	
8 OH's	576.0
Rolling Mill Capacities	N.A.
Finished Steel Production	414.7
Power Plant Capacity	25,000 kw

11. Production and Capacity
Khartsyzsk Pipe Plant
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	0
Steel Production	0
Rolling Mill Capacities	N.A.
Finished Steel Production	20.0
Power Plant Capacity	N.A.

12. Production and Capacity
Kramatorsk Metallurgical Plant
imeni Kuybyshev
1953

	Thousand Metric Tons
Metallurgical Coke Production	
1 Battery - 50 Ovens	132.5
Pig Iron Production	
3 BF's	517.1
Steel Production	
5 OH's	276.8
Rolling Mill Capacities	N.A.
Blooming Mill	N.A.
620-mm Bar Mill	N.A.
280-mm Bar Mill	N.A.
Sheet Mill	N.A.
Structural Mill	N.A.
Wire Mill	N.A.

12. Production and Capacity
Kramatorsk Metallurgical Plant
imeni Kuybyshev
1953
(Continued)

	Thousand Metric Tons
Finished Steel Production	199.3
Power Plant Capacity	N.A.

13. Production and Capacity
Novo-Kramatorsk Machinery Building Plant
imeni I.V. Stalin
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	0
Steel Production	
4 OH's and 2 Electrics	250.6
Rolling Mill Capacity	0
Finished Steel Production	137.8
Power Plant Capacity	N.A.

14. Production and Capacity
Staro-Kramatorsk Machinery Building Plant
imeni Ordzhonikidze
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	0

14. Production and Capacity
Staro-Kramatorsk Machinery Building Plant
imeni Ordzhonikidze
1953
(Continued)

	Thousand Metric Tons
Steel Production	
2 Converters and 1 Electric	24.0
Rolling Mill Capacity	
Finished Steel Production	13.2
Power Plant Capacity	N.A.

15. Production and Capacity
Kirov Machine Plant
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	0
Steel Production	
4 Converters and 4 Electrics	62.0
Rolling Mill Capacity	0
Finished Steel Production	N.A.
Power Plant Capacity	N.A.

16. Production and Capacity
Novo Gorlovka Coke-Chemical Plant No. 3
imeni Koksakhim
1953

	Thousand Metric Tons
Metallurgical Coke Production	1,450.0
4 Batteries - 233 Ovens	
Pig Iron Production	0
Steel Production	0
Rolling Mill Capacity	0
Finished Steel Production	0
Power Plant Capacity	N.A.

17. Production and Capacity
Konstantinovka Coke-Chemical Plant No. 17
1953

	Thousand Metric Tons
Metallurgical Coke Production	
1 Battery - 40 Ovens	300.0
Pig Iron Production	0
Steel Production	0
Rolling Mill Capacity	0
Finished Steel Production	0
Power Plant Capacity	N.A.

18. Production and Capacity
Konstantinovka Metallurgical Plant
imeni Frunze
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	
3 BF's	260.1
Steel Production	
5 OH's	245.9
Rolling Mill Capacity	N.A.
Finished Steel Production	177.0
Power Plant Capacity	N.A.

19. Production and Capacity
Debal'tsevo Steel Foundry
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	0
Steel Production	
1 OH and 1 Electric	14.6
Rolling Mill Capacity	N.A.
Finished Steel Production	8.0
Power Plant Capacity	N.A.

20. Production and Capacity
Nikitovka Coke-Chemical Plant
1953

	Thousand Metric Tons
Metallurgical Coke Production	
2 Batteries - 80 Ovens	150.0
Pig Iron Production	0
Steel Production	0
Rolling Mill Capacity	0
Finished Steel Production	0
Power Plant Capacity	N.A.

21. Production and Capacity
Shcherbinovka Coke-Chemical Plant No. 11
1953

	Thousand Metric Tons
Metallurgical Coke Production	N.A.
Pig Iron Production	0
Steel Production	0
Rolling Mill Capacity	0
Finished Steel Production	0
Power Plant Capacity	N.A.

22. Production and Capacity
Toretsk Machinery Factory imeni Voroshilov
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	0
Steel Production	
2 OH's - 6 Converters	96.4
Rolling Mill Capacity	0
Finished Steel Production	53.0
Power Plant Capacity	N.A.

23. Production and Capacity
Yenakiyevo Metallurgical Plant
imeni Ordzhonikidze
1953

	Thousand Metric Tons
Metallurgical Coke Production	1,300.0
4 Plus Batteries - 340 Ovens	
Pig Iron Production	
6 BF's	1,097.3
Steel Production	
5 OH's and 3 Converters	463.6
Rolling Mill Capacity	N.A.
1, 100-mm Blooming Mill	N.A.
800- or 850-mm Rail and Structural Mill	N.A.
Thin Sheet Mill	N.A.
Wire Mill	N.A.

23. Production and Capacity
Yenakiyevo Metallurgical Plant
imeni Ordzhonikidze
1953
(Continued)

	Thousand Metric Tons
Finished Steel Production	383.0
Power Plant Capacity	N.A.

Plant Studies - Stalino Oblast

A. Zhdanov Complex.

1. Azovstal Metallurgical Plant imeni Sergo Ordzhonikidze. (Southern Magnitka; Mariupol' Metallurgical Plant).

25X1A2g [redacted]

a. Location.

47° 06'N - 37° 36'E, Zhdanov, Stalino Oblast, Ukraine, SSR. The plant is located approximately 2 kilometers (km) south of the center of the town, approximately 500 meters (m) northeast of the port of Zhdanov, and 500 m south of the main railroad line, Zhdanov-Stalino. A branch line crosses the Kal'mius River on the north side of the plant. The plant is on an island near the shore of the Sea of Azov, separated from the mainland by the Kal'mius River. At this point the Kal'mius runs east-west, with Zhdanov on its northern bank and Azovstal on its southern. The river is not navigable beyond the bend. The western boundary of the plant borders on the open sea. There is a small harbor on the Sea of Azov which is used for the delivery of raw materials, and although its entrance was blocked by a vessel sunk during World War II, it is open for use at the present time. 1/*

* Footnote references in arabic numerals are to sources listed in Appendix C.

b. History and Development.

Plans to build a steel mill at Mariupol' (now Zhdanov), consisting of a byproducts coke plant, blast furnaces, open-hearth furnaces, and rolling mills were formulated in the late 1920's. Variances in reports on the planned capacities of the plant are shown in the following tabulation:

Planned Capacities of the Azovstal Metallurgical Plant

	Thousand Metric Tons		
Product	Source 2/	Source 3/	Source 4/
Pig Iron	2,208	2,500	1,500
Steel	1,068	3,300	1,400
Rails	650	1,000	850
Rolled Products	800		

The plant site was surveyed in 1931 and construction began in 1932. The sum of 468 million rubles was earmarked for investment in the building of Azovstal, and it was planned to have the plant in full operation by the end of 1938.

By 1 January 1935, blast furnaces No. 1 and No. 2, each with a capacity of 930 cubic meters (cu m), were in operation; they had produced 480,000 metric tons (MT) of pig iron in 1934. During the first quarter of 1935 the first tilting open-hearth furnace was placed in operation, and two other furnaces were under construction.

On 1 January 1936 it was announced that over 291 million rubles had been invested in capital equipment and facilities at the Azovstal Metallurgical Plant.

According to an authoritative source, the following were in operation just before World War II: 4 blast furnaces, each with a capacity of 930 cu m; 2 blast furnaces, each with a capacity of 1,300 cu m; and 6 to 8 tilting open-hearth furnaces, with daily capacities ranging from 250 to 400 MT. In addition, some sources reported the following installations in operation: a coke-chemical plant consisting of three batteries of coke ovens, a flotation plant, sintering facilities, a blooming mill, a rail and structural mill, and various intraplant facilities and installations.

There are no reports available on the amount of destruction accomplished by the USSR in the face of the advance of the German Army. During German occupation the plant was operated by Krupp of Essen, Germany, and some production was realized. Upon the German retreat, blast furnaces, open hearths, rolling mills, and other installations were destroyed or damaged. With the reoccupation of the area by the Red Army, the reconstruction and restoration of Azovstal began immediately. 5/

c. Raw Materials and Other Inputs.

Prewar. Iron ore and vanadium were shipped by water from Kerch', and apatite came by rail from the Kola Peninsula. 6/

At Present. Little information is available, except on the sources of iron ore used in the plant. During World War II a 2,000-ton ship was sunk in the harbor entrance, and until approximately mid-1949 Azovstal was dependent upon rail shipments of iron ore from Krivoy Rog. After the harbor entrance was cleared, the plant continued to use Krivoy Rog ore, but Kerch' ore again is being shipped to the plant. 7/

d. Coal and Coke.

Coal. Before World War II, coal was shipped to the plant by rail from the mines around Stalino and the Donets Basin, and it is assumed that the same sources are being used at present. 8/

Coke.

Prewar. Before World War II there were three coke batteries in operation at Azovstal. As a result of bombardment two of these batteries, the byproducts plants, and the auxiliary shops were destroyed completely, and the third coke battery was damaged seriously.

Reconstruction Period. Reconstruction of the coke plant was of primary importance in the rebuilding of the steel mill. In

October 1946, it was announced that No. 2 coke battery, consisting of 69 ovens capable of producing a total of 1,200 MT of coke per 24 hours, had been placed in operation; and that gas was being utilized at the steel plant and in the city of Zhdanov. In April 1947, Soviet newspapers carried the story that No. 3 coke battery was being restored and that when completed it would satisfy the steel plant's requirements for coke and gas and would also provide a surplus of gas for use in neighboring enterprises -- particularly in the Il'ich steel plant, to which a 15-km gas line was being built. The battery went into operation in January 1949. Coke battery No. 1 was recommissioned in January 1949. The construction of coke battery No. 4, a new installation, was announced early in 1949, and it is assumed that it is now in operation. 9/

At Present. An authoritative source 10/ made the following estimate of present coke-chemical facilities at Azovstal:

Number and Type of Coke Batteries	4 Becker
Number of Ovens	276
Volume of Oven (Cu M)	19.8
Width of Oven (Millimeters)	406
Normal Coking Time (Hours)	16
Coal Charge Per Oven, Dry Basis (MT)	15.1
Total Daily Carbonization Capacity (MT)	6,250
Annual Carbonization Capacity (MT)	2,250,360
Annual Coke Capacity, Dry Basis (MT)	1,710,000
Annual Coke Capacity, Moist Basis (MT)	1,750,000
Refined Benzene Capacity (MT)	14,175
Refined Toluene Capacity (MT)	3,325
Crude Tar Capacity (MT)	65,713
Ammonium Sulfide Capacity (MT)	23,258

e. Ironmaking Facilities.

Prewar. The following blast furnaces were in operation at Azovstal at the time of the German occupation of the Ukraine:

Number of Blast Furnaces	Working Volume (cu m)
4	930 each
2	1,300 each

There is no information on the amount of destruction accomplished by the USSR in the face of the German advance into the Ukraine, but upon the retreat of the German Army, at least four blast furnaces were destroyed and the others damaged seriously. 11/

Reconstruction Period. Blast furnaces were restored, modernized, and enlarged at Azovstal during the postwar period.

Work on blast furnace No. 3 began early in 1944, and by July 1945 it was in operation with a reported daily output of 816 MT and a working volume of 1,300 cu m.

Blast furnace No. 4 was partially destroyed by the Germans. The destruction caused the furnace to settle 3.5 m and to shift 1.3 m to one side, resulting in a list of 20 degrees. The furnace was not dismantled by the USSR, but it was eased into position and raised through the efforts of Soviet engineers, for which they received wide acclaim. No. 4 was fired for the first time on 10 September 1946, and the announcement was made that it weighed 1,360 MT, had a working volume of 1,300 cu m, and consumed 2,500 MT of iron ore, 1,300 MT of metallurgical coke, and 800 MT of limestone daily. Yearly capacity was claimed to be 450,000 MT. Daily production was announced as ranging from 1,000 to 1,100 MT, or, estimated on a yearly basis, 340,000 MT to 375,000 MT. In a letter to Stalin on 20 September 1946 from the blast furnace workers at Azovstal, it was claimed that not only was the blast furnace in production but also that the airblowing station, the gas purifier, and all transportation facilities were in operation.

In February 1947 it was announced that 2 of the 930-cu m furnaces would be rebuilt and the working volume increased to 1,300 cu m. In April 1948, 4 blast furnaces were in operation and 2 were being reconstructed.

In September 1948 it was announced that the first all-welded blast furnace in the Donbas and the second in the Soviet Union, No. 2 at Azovstal, was being welded and was scheduled to start production in April 1949. The furnace was blown in ahead of schedule in February 1949. In October 1948 it was announced the No. 1 furnace was under construction. In November 1948 it was claimed that No. 3 blast furnace at Azovstal was being rebuilt and that it would be the second all-welded furnace at the plant. It was scheduled for operation on 22 December 1948.

The chief metallurgist of a leading US steel company was visited by a group of Soviet blast furnace experts in 1947. The chief of the delegation claimed that Azovstal had the finest turboblowing equipment in the world. He said that there were 5 new furnaces at the plant which were served by 5 turboblowers arranged in tandem, any 1 of which could be shut down for repair without disrupting the operation of the other 4. The turboblowers were of Skoda (Czechoslovakia) design and construction. 12/

The blast furnace utilization coefficient for the first 6 months of 1948 was claimed to be 1.07, an improvement over the planned utilization of 1.10. 13/

At Present. Six blast furnaces are believed to be in operation at Azovstal.

Estimated 1952 Blast Furnace Production at Azovstal*

Blast Furnace Number	Volume (Cu M)	Coefficient	Operating Days	Production (Thousand MT)
1	930	1.0	340	316.2
2	930	1.0	340	316.2
3	1,300	1.0	340	442
4	1,300	1.0	340	442
5	1,300	1.0	340	442
6	1,300	1.0	340	442
Total Pig Iron Production				2,400.4

Estimated 1953 Blast Furnace Production at Azovstal*

Blast Furnace Number	Volume (Cu M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
1	930	0.98	340	322.6
2	930	0.98	340	322.6
3	1,300	0.98	340	451.0
4	1,300	0.98	340	451.0
5	1,300	0.98	340	451.0
6	1,300	0.98	340	451.0
Total Pig Iron Production				2,449.2

* See Appendix C, Methodology, for use of coefficient in estimating production.

f. Steelmaking Facilities.

Prewar. In 1941-42 all open hearths at Azovstal were of the tilting type.

Furnace Number	Hearth Area (Sq M)	Capacity (MT)	Year Completed
1	65.0	250	1935
2	59.4	250	1935
3	59.4	250	1935
4	59.4	250	1936
5		400	1939
6		400	Under Construction in 1940
7			Under Construction
8			Under Construction

In addition to the open-hearth furnaces, there were 3 Thomas converters of unknown capacity which were built in 1935 and 1 Thomas converter which had a capacity of 40 MT, or a total of 7 converters. A 3-ton electric furnace went into operation in 1935. Two hot metal mixers, each with a capacity of 1,300 MT, worked in conjunction with the open hearths. One source claimed that it was the prewar plan to operate 12 open-hearth furnaces, each with a yearly capacity of 180,000 MT, or a total of 2,160,000 MT per year. 14/

Considerable damage was wrought by the Germans to the steelmaking facilities of Azovstal, but the extent is not known.

Reconstruction Period. Reconstruction of steelmaking facilities began at Azovstal shortly after the Germans left the area of Zhdanov. In the spring of 1944 it was announced that the electric furnace which had been in operation before the war had been restored and that other electric furnaces were under construction. Work on the restoration of the open-hearth furnaces seems to have lagged. There was no mention of reconstruction until September 1944, when it was announced that three large furnaces were in the process of being rebuilt. It was not until April 1947 that the first open-hearth furnace, No. 3, was placed in operation. It was a tilting furnace with a capacity of 350 MT. The slowness of placing steelmaking facilities back into operation was acknowledged in the press in May 1947 with the statement that restoration at Azovstal was behind schedule and that, of the 3 furnaces slated to be in operation by the end of 1946, only 1 had been completed.

In March 1946 it was announced that when the reconstruction and modernization program was completed, Azovstal would have a total of 9 open hearths, 1 more than were in existence or under construction at the plant before World War II. In July 1947 it was announced that 2 250-ton capacity furnaces would be rebuilt, starting in July and August. No. 4 open hearth was fired for the first time on 15 August 1947. In October 1947, the Chief Engineer of the Azovstal Trust, Engineer (fnu) Ioborchy, made the statement that 4 large tilting open-hearth furnaces had been rebuilt and that, although the Five Year Plan called for the completion of No. 5 in March 1948, workers at the plant had decided to complete it by November 1947. On 4 November, No. 4 furnace, completely mechanized and with a capacity of 300 to 400 MT, went into production.

In September 1948 it was announced that No. 6 open hearth, a tilting furnace with a capacity of 350 MT, had gone into production and that restoration of the prewar open-hearth capacity at Azovstal had been completed. This statement is interpreted to mean that the 5 furnaces which were in operation before the war and which had been restored, as well as No. 6, were in production; and that the 2 open hearths under construction at that time had not yet been brought into production. In October 1948, it was stated that another electric furnace had been placed in operation. In January 1949 it was announced that open-hearths No. 7 and No. 8 were being rebuilt; a few days later it was stated that one of these had been placed in production. In February 1949, workers at the plant promised to complete two more open hearths during the year.

There was no mention of the restoration of the Thomas converters mentioned by one source as being in operation prior to the war. 15/

Improvements in Practices. The following press announcements throw some light on improvements in open-hearth shop practices at Azovstal.

Output of Steel Per Square Meter of Hearth Area.

	Calendar Period			Nominal Period		
No. Open Hearths	1936	1937	1938	1936	1937	1938
4	4.70	4.89	5.51	5.41	5.47	6.10

The average hearth area of the four furnaces was 60.8 sq m. 16/

It was stated in April 1946 that accelerated heats had systematized production at Azovstal. The 350-ton tilting furnaces at the plant were operating on coking gas instead of oil, and the normal time for a heat was 18.5 hours. On 15-16 April, 2 steelworkers produced a heat of 341.7 MT in 12 hours, and from each square meter of hearth area, 11.5 MT of steel were taken. 17/ In May 1948, Azovstal was testing a dolomite machine for filling the back walls of the open-hearth furnaces, a task which previously had been done by hand. 18/ During the first 6 months of 1948 an average of 6.2 MT of steel per square meter of hearth area was realized. The plan was 5.87 MT. 19/

In June 1949 the operation of the plant was criticized. It was claimed that the excellent work of the open-hearth section was being delayed because of a lack of molds and by the poor quality of the molds available. Improvement of the repair section of the shop was also considered a necessity. 20/

It was also announced in June 1949 that since October 1947 the open-hearth workers had won the title of the best steel smelters in the USSR, 12 out of 13 times. Prior to the war the planned melting time was 19 hours. In 1948 the norm was 18.5 hours, but smelting was attained in 17 hours and 42 minutes. In February 1949 the average smelting time was 16 hours and 6 minutes, and in April it was reduced to 15 hours and 42 minutes. The May average of 15 hours and 30 minutes was reduced to 15 hours in June. In spite of the accelerated speeds in melting time, the life of the furnaces was improved. One hundred and forty melts could be made before it was necessary to overhaul the open-hearth furnaces. 21/ In September 1949 the normal yield of raw steel per square meter of hearth area was 7.1 MT, but the shop was obtaining 7.2 MT. Workers were attempting to reduce the melting time to 14 hours. 22/ In June 1950, it was announced that production of steel per square meter of hearth area had been increased to 9 or 10 tons, as compared to a prewar average of 4.5 MT. 23/

In December 1951 a new method to indicate the weight of each pouring of molten steel into molds was introduced at Azovstal. Previously the weight was calculated and in order to avoid underweight ingots, up to 300 kilograms (kg) of metal were added in excess of the required weight. Later in the rolling process this excess had to be removed and resmelted. Engineer (fnu) Zhemchuzhnikov constructed a device which measured the exact weight of each pouring. 24/

At Present. Nine open-hearth furnaces, with capacities estimated at approximately 150 MT, and 2 electric furnaces are in production at the present time at Azovstal. 1952 production is estimated as follows:

Estimated 1952 Open-Hearth Steel Production at Azovstal*

Open-Hearth Furnace Number	Prewar Hearth Area (Sq M)	Estimated 1952 Hearth Area (Sq M)	Estimated Coefficient	Operating Days	Estimated Production (Thousand MT)
1	65.0	65.0	7.0	325	147.9
2	59.4	59.4	7.0	325	135.1
3	59.4	59.4	7.0	325	135.1
4	59.4	59.4	7.0	325	135.1
5		59.4	7.0	325	135.1
6		65.0	7.0	325	147.9
7		65.0	7.0	325	147.9
8		65.0	7.0	325	147.9
9		65.0	7.0	325	147.9
Total Open-Hearth Steel Production					1,279.9

* See Appendix C, Methodology, for use of coefficient in estimating production.

Electric steel production is estimated at 6,000 to 8,000 MT.

Estimated 1953 Open-Hearth Steel Production at Azovstal*

Open-Hearth Furnace Number	Estimated Hearth Area (Sq M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
1	65.0	7.2	325	159.1
2	59.4	7.2	325	145.4
3	59.4	7.2	325	145.4
4	59.4	7.2	325	145.4
5	59.4	7.2	325	145.4
6	65.0	7.2	325	159.1
7	65.0	7.2	325	159.1
8	65.0	7.2	325	159.1
9	65.0	7.2	325	159.1
Total Open-Hearth Steel Production				1,377.1

1953 electric steel production is estimated at 6,000 to 8,000 MT.

g. Primary Rolling Facilities.

Before the war, Azovstal Metallurgical Plant had a large blooming mill, which was destroyed by the Germans upon their retreat from the Ukraine. Under Lend-Lease terms, the Soviets purchased from a US concern, at a cost of $11 million, a blooming mill and a rail and structural mill, which were supposed to be erected in a plant in the Urals. The mills were shipped to the USSR in 1945, and instead of installing them in the Urals it was decided to erect them in the reconstructed Azovstal plant. The blooming mill went into operation on 25 July 1948. The mill was designed for an annual capacity of 1 million MT of blooms and

* See Appendix C, Methodology, for use of coefficient in estimating production.

slabs, on a basis of 7,000 operating hours, and to roll the following sizes 25/: 200 x 200 mm, 250 x 250 mm, 300 x 300 mm, and 100 x 700 mm.

Steel ingots are delivered from the soaking pit by an ingot buggy, which has a speed of 850 feet per minute, to an ingot scale and turner and on to the blooming mill. The blooming mill is 46 x 100 inches and is driven by a 7,000-horsepower (hp) motor, which is connected directly through a pinion stand to the mill. There is a scale pit located alongside of the mill. The blooms pass through a bloom shear which is driven by two 350-hp motors and which has the capacity of making 9 cuts per minute. Crops are carried away on a crop conveyer to the quenching pits. Slabs are routed to two slab pilers. From this point the slabs can be taken off the line for shipment to other mills for further processing. Blooms are pushed off by two bloom pushers across bloom transfer and cooling beds to the lifting cradles, which pile them on a bloom transfer table. Blooms are transferred from this table to bloom pushers, which deliver them to three reheating furnaces.

Blooms may continue to the 35 x 92-inch, 2-high, 5,000-hp, direct-drive roughing mill without passing through the reheating furnaces, may be delivered through the furnaces, may be pushed off to a shear approach table, or may be transferred off the line. After passing through the roughing mill, the steel continues to the 32-inch rail and structural mill. 26/

h. Finishing Rolling Facilities.

A rail and structural mill, which was in production before World War II, was destroyed by the Germans. Reconstruction of the building to house a new mill was begun in early 1947, and on 23 October 1948, a rail and structural mill purchased from a US concern was placed in operation. This mill was designed to produce 700,000 MT per year, operating on a basis of 6,400 hours, to make the following products 27/:

Rails	43.5 kg/meter
Beams	240 mm
Beams	360 mm
Beams	500 mm
Squares	127 x 127 mm

The rail structural mill consists of three stands. There are 2 3-high mill stands, 32 x 76 inches, which are driven by a 6,000-hp motor, and one 2-high mill stand, 32 x 76 inches, which is driven by a 2,500-hp motor. After leaving the rail and structural mill, the steel proceeds to the saw tables. At the saw table are 5 saws with 54 inch diameter saw blades, which operate at 1,690 revolutions per minute (rpm). A conveyer is placed in front of the first saw, which delivers sawn rail ends to an impact test machine and rail breaker. Rails and structurals proceed to three cooling beds and are racked across these beds to rail transfer and loading tables. Cranes deliver rails from the loading transfer tables to 32 rail cooling pits. Rails may be delivered from the cooling pits to the rail delivery table, which leads to rail finishing equipment consisting of gag presses, rail turners, rail drilling machines, rail ending machines, and end hardening units. Facilities are available after the cooling beds, and separate from the rail finishing department, for sawing, shearing, weighing, and delivery of structural shapes. 28/

Drop Forge Shop. In February 1949 a drop forge shop with several steam hammers was in operation. 29/

Stamping Department. A stamping department was in operation in October 1946. 30/

i. Intraplant Services.

Electric Power. A coal-fired power station is located on the Sea of Azov, east of the blast furnaces. 31/

An electric power transformer plant is located approximately 60 m south of the rolling mills, 700 m north of the Sea of Azov, and 3 km east of the blast furnaces. Power is received by overhead high-tension cable from Kurakhov GRES, approximately 110 km north of Zhdanov. The power is 120,000 volt (v), 3-phase alternating current (AC).

There were also 3 main transformers -- 3 x 3 x 5 to 6 m, each weighing 110 to 115 MT -- which were mounted on railroad trucks in the open and which were located on the north side of the transformer house. These were of oil called step-down type, reducing the 120,000 v to 12,000 to 2,000 v. Two were in constant use, and the third transformer was held in reserve. All were of

US manufacture, and the source heard that two more such transformers would be installed at a later date. On the floor of the transformer house were 16 smaller step-down transformers. These were painted black, were 2 x 1.5 x 1 m in size, and were cooled by a noncirculating system. These transformers stepped down the voltage from 12,000 v to 3,000 v and 1,000 v. Another bank of these step-down transformers was located in the western part of the transformer house and was held in reserve. These transformers could be placed in operation by throwing a switch.

From the transformer house, power was distributed as follows:

12,000-v line to Il'ich Steel Plant,
10,000-v line to the Azovstal Metallurgical Plant,
6,000-v line to the coke-chemical plant, and
3,000-v line to the Azovstal rolling mills.

Current was AC, and line voltages were stepped down to 440 v by transformer stations located in various parts of the plant.

The main building of the transformer plant is T-shaped, approximately 35 m long and 6 m wide. It is constructed of cement-faced brick and has a flat concrete roof. On the ground floor is a 1 x 1 x 1-m battery, which delivers 220-v current for emergency use. East of the battery room is a 2 x 2-m room containing acid bottles for use in the battery. In the southwest corner of the ground floor is a laboratory. Switch installations are located both on the main and second floor of the building. On the south side of the main building were 4 oil containers, 5 m in diameter and 9 m high -- 6 m underground and 3 m above ground. These were connected with each other and with the transformers by a pipe line, and there was a pumping installation. Cleaning devices were located on top of each oil container. 32/

Water Supply. In early 1949 there were two water filter stations within the plant area. In 1 filter station there were 6 brick-built filters, 3 of which were 20 to 25 m high and 20 m in diameter, and the others were 10 m high and 10 m in diameter. Six more were under construction. The source believed that the filters were packed with soda. Sea water was pumped into these tanks, filtered, and then pumped to the rolling mills. The other filter plant processed filtered and distilled water, which was used for human consumption. Three concrete reservoirs were located just outside of the plant area and held 5 million liters of fresh water which was piped from Maltshik, approximately 15 km east of the plant. 33/ It was announced in June 1948 that the blooming, rail, and structural mills consumed 10,000 cu m of water per hour. 34/

Boiler House. In April 1948 the boiler shop contained 4 boilers, 20 x 15 m. Three or 4 more were under construction. 35/

Refractory Plant. It was announced that a shop for making brick from blast furnace slag would be placed in operation early in 1941. 36/

Telephone Exchange. A telephone exchange was placed in operation in August 1945. 37/

Laboratory. In July 1948 it was announced that the "Palace of Metallurgists" was being restored. 38/

j. Products and Production.

Products. The following products are being produced at Azovstal Metallurgical Plant: metallurgical coke, pig iron, open-hearth steel, electric steel, rails and accessories, and various types of structural steel. 39/

In 1947 an article appeared in the press which stated that steel mills at Mariupol' (now Zhdanov), namely the plants imeni Kuybyshev, Il'ich, and Azovstal, were producing graphitized steel, which was successfully replacing nonferrous antifriction metal in heavy duty bearings. This steel was claimed to have high tensile strength and was resistant to wear. It was also sufficiently ductile to resist impact loads, as in the bearings of rolls of steel rolling stands. One percent copper was added for ductility. The bearings underwent only thermal treatment after being cast. Bushings cast for roll gangs of the pipe piercing stands cast from this graphitized steel were replacing the former bronze bearings. 40/

In October 1951 it was announced that a new product was being produced at the mill, sheet piling in flats and channels. 41/

Production.

Production at Azovstal
Selected Years, 1934-53

Thousand Metric Tons

Year	Metallurgical Coke	Pig Iron	Steel	Rolled Products
1934		475.5 43/		
1935		533.6 44/	132.0 49/	
1936		317.4 45/	318.0 50/	
1937		423.9 45/		
1938		476.7 45/		
1941		1,500.0 46/		
1946		450.0 47/		
1948		2,000.0 48/		
1950			1,015.0 51/	
1951	1,700 42/			
1952	1,700 42/	2,400.4 52/	1,285.9 48/	925.7 48/
1953	1,700 42/	2,449.2 48/	1,383.1 48/	995.8 48/

k. Distribution.

In February 1946 it was announced that steel was being sent to the Il'ich Steel Plant imeni Kuybyshev, which was making pipe for the Baku oil industry. 53/ In March 1947, some pig iron was reported as being sent to Il'ich Steel Plant. 54/ In September 1947, a press item stated that the first pig iron produced in the No. 3 blast furnace had been shipped to the Moscow Automobile Plant imeni Stalin. 55/ Two sources stated that in June 1948 the Azovstal blooming mill was supplying not only the rail mill at the plant but also rolling mills in the Donbas. 56/

Prisoners of war reported that in February 1949 semi-finished armor plate was sent to Il'ich for further processing. 57/ Another source at the same time reported that two-thirds of pig iron production was shipped to Zaporoshstal and Il'ich. 58/

In October 1950 it was announced that the rolling mill was producing I-beams and channel bars for the Kuybyshev and Stalingrad hydroelectric power stations. 59/

In November 1950, the Moscow Radio broadcast the information that Azovstal had shipped a train load of steel lath to the Kuybyshev power station. 60/ It was also announced that in 1950, steel girders for the Volga power station projects and rails for Kuybyshev had been produced. 61/ In January 1952, Azovstal was shipping a new type of wide flange steel beam for the construction of bridges and for the framework of large buildings to the Dnepr projects and to Moscow. Each beam was over 15 m long and weighed nearly 1.5 MT. It was stated that this was the eighth new type of production which workers had begun during the year. 62/

1. Plant Efficiency.

In January 1947 the stamping department of Azovstal was awarded the Red Banner and first prize in the December 1946 All-Union Competition of the VTsSPS and Ministry of Ferrous Metallurgy. 63/

In August 1947 a Kiev newspaper criticized the plant, saying that the plant transportation system, which was the nerve center of this important establishment, was not working satisfactorily. Because of the poor work of the railroad division, the plant had accumulated large piles of finished goods and was suffering great losses. Nearly one million rubles were paid in fines for the demurrage of freight cars between January and June 1947. In January and February, hundreds of cars were standing idle every day at the plant. This situation was caused by the plant's locomotives, unsatisfactory conditions of the tracks, and the lack of a simple means of snow removal. The article went on to say that winter was approaching again and that no steps had been taken to accumulate coal and ore and to prevent the recurrence of the same conditions. Only 700 out of 3,000 sections of snow fence and 9,000 out of 49,000 sleepers were available. There were no snow shovels at the plant, the depot and railroad tracks had not been repaired, and the plant's rail signal system was out of order. The newspaper claimed that the plant's locomotives were the real bottleneck in the installation and that both blast furnace and open-hearth production were being held up. It claimed also that the underlying reason for all this inefficiency was the lack of political indoctrination in the transportation division, as a result of which more than 50 workers were not fulfilling norms. 64/

Another source claimed that in March 1949, 70 percent of the rails produced were unservicable. Production was hampered by mechanical failures in the rail mill, which occurred on the average of once a month and which took 2 weeks to rectify. The larger part of the equipment was American or German, and it was poorly serviced; rusted parts were painted with preservatives without first removing the rust, and lubrication was inadequate and improperly applied. 65/

Early in December 1949, it was claimed that the 1949 quota of production under the Five Year Plan had been completed on 30 November in the rolling mill. 66/ In May 1951 it was announced that several engineers at Azovstal had devised a new method of preventing rust of pivot journals in mill rollers. This permitted the extension of the length of service of the rollers and decreased the amount of idle time in the rolling mills. 67/ During the pre-October Anniversary drive, probably in 1950, furnace workers at Azovstal put into operation a new high-speed method of furnace charging which enabled all furnace brigades to increase the smelting output of pig iron by 10 to 12 MT of metal per shift. The plant's open-hearth shops were also applying high-speed methods and carried out 150 smelting processes in October, saving enough time to produce 1,000 MT of metal. The plant's rolling mill shop switched all blooming mills to high-speed methods, and production increased 10 percent. 68/

m. Administration.

In 1938 the plant was under the administration of GUMP, Chief of Administration of the Metallurgical Industry. In 1941 it was administered by NKChM, People's Commissariat for Ferrous Metallurgy. At present the plant is under the direction of the Ministry of Ferrous Metallurgy. 69/

n. Personnel.

Number of Workers. Reports of the number of workers vary with each source, ranging from 10,000 to 35,000 workers. It is believed that approximately 20,000 workers, 40 percent of whom are women, are employed in the plant on a three-shift basis. 70/

Managerial Personnel. Director of Azovstal Metallurgical Plant in July 1948 was P. Kogan. 71/ Manager of Azovstal Trust, in charge of construction, in July 1948 was (fnu) Poborchi. In October 1948, the manager was A.V. Tishchenko. 72/ Foreman of Azovstal Stamping Department in January 1947 was (fnu) Gaichuk. 73/ Engineer-in-Charge of Installing Heavy Machinery in the Rolling Mills in October 1948 was N.A. Sevalkin. 74/ Engineer-in-Charge of Reconstruction of No. 4 blast furnace in October 1948 was P.A. Mamontov. 75/

o. Locational Characteristics.

The plant is surrounded by a brick wall approximately 2 m high. All entrances are guarded, and a pass is required for admittance to the plant area. 76/

2. Il'ich Steel Plant (Zartana or Sartana Metallurgical and Pipe Works; /former name, Nikopol-Mariupol- Metallurgical Plant/; includes the Kuybyshev Pipe Mill /former name Mariupol' Pipe Factory/ and the Zhdanov Tank Car Plant). [redacted] 25X1A2g

The Il'ich Steel Plant is divided into two parts, Lenin Zavod A and B, which are separated by a road. Zavod A includes 6 open hearths, 1 electric furnace, the Kuybyshev Pipe Mill, and the Zhdanov Tank Car Plant. Zavod B contains 10 open hearths and rolling mills, and produces bars, rods, structural shapes, plate and sheet, tank turrets, and so on. Reports and observations of the two sections of the plant are confused and obscure; so, for the purpose of this plant study, the steelmaking facilities and finishing facilities have been combined and considered as a whole.

a. Location.

47° 08'N - 37° 35'E. Zhdanov, Stalino Oblast, Ukraine SSR. Zhdanov formerly was called Mariupol'. The plant area is located about 4 km north of the mouth of the Kal'mius River and the Azovstal Metallurgical Plant in a surburb of Zhdanov called Sawodskoi. 1/

b. History and Development.

Il'ich Steel Plant was in existence at the time of the Bolshevik Revolution, after which it was known as the Nikopol'-Mariupol' Metallurgical Plant. It was constructed originally with the help of Belgian engineers, and was administered by the "Belgian S.A. of the Russian Providence," headquarters of which were in Petersburg. In 1933 a seamless pipe mill was built and installed by the German firm Demag, of Duisberg.

During World War II, in the face of the German advance, the USSR destroyed many buildings and installations and evacuated machinery and equipment to Nizhne Tagil, Chelyabinsk, and Magnitogorsk. The most essential installations were rebuilt by the Germans, who operated the plant on a limited scale and who inflicted considerable damage on their retreat from the area. Estimates of war damage to the mill varied from 50 to 65 percent. With the Soviet reoccupation of the Ukraine, reconstruction of Il'ich began immediately, and at the time of the departure of the last group of prisoners of war in September 1949, the rebuilding of the plant was approaching completion. In June 1947 it was announced that during the Fourth Five Year Plan (1946-50), Il'ich would not only be restored but would be greatly expanded. 2/

c. Raw Materials and Other Inputs.

Prewar. Iron ore for the charging of blast furnaces which were in operation before World War II came from Krivoy Rog. 3/

At Present. It is claimed that there is an abundance of raw materials necessary for the operation of a steel plant within easy rail distance of this plant.

Scrap in 1949 was imported principally from Germany, and also came from scrap collection centers in the Ukraine. One source estimated that 180 to 200 MT of scrap were received daily. According to one source, pig iron in 1949 was received from Stalino; however, in 1949 it came by rail from Azovstal Metallurgical Plant at nearby Zhdanov. One source claimed it was received at the rate of 200 MT per day. Manganese, according to one source, was received by rail at the rate of 120 MT per week. Oil, probably fuel oil, was arriving at the rate of 200,000 liters per day in September 1949. Dolomite, although it was prepared within the plant area, did not meet consumption requirements, and production was supplemented from an unknown source. Steel ingots, a source stated in September 1949, were being shipped into the plant from Dnepropetrovsk at the rate of 1,500 MT per day. 4/

d. Coal and Coke.

Coal. Coal is received by rail from the Donets Basin. Requirements are not known. 5/

Coke. It is not believed that there are any facilities for the production of coke at the Il'ich Steel Plant. Two prisoners of war reported the existence of a small coke plant on the extreme edge of the plant site, which was destroyed during World War II, but both observations are considered erroneous. Coke and coke-gas are probably received from the large coke-chemical plant in operation at Azovstal Metallurgical Plant, located a few kilometers to the south.

In March 1946 it was announced that before World War II, installations at Il'ich received as much as 15,000 cu m of gas an hour from Azovstal by gas line. During hostilities, the Germans destroyed many kilometers of the gas line and the gas station, and in early 1946 reconstruction of these facilities was under way. A statement was published in April 1947 that the reconstruction of the No. 4 coke battery at Azovstal had begun, and that when completed the coke-making facilities would not only satisfy the coke and gas requirements of Azovstal but would also create a surplus for the use of neighboring enterprises. The article also stated that a 15-km gas line to Il'ich was under construction. 6/

e. Ironmaking Facilities.

Two blast furnaces, with capacities of 530 and 510 cu m respectively, were in operation at Il'ich before World War II. These furnaces were destroyed during the war. In May 1947 it was announced that the Leningrad Branch of the Steel Institute of Planning of Metallurgical Works (GIPROMEZ) had worked out, under the supervision of A.N. Ramm, the Director of Technical Services, a plan for the reconstruction of the blast furnace installations at Il'ich. In September 1949, 2 furnaces, each with a capacity of 600 MT, were estimated to be 70 percent complete. It is believed that they are now in operation at the plant. 7/

Estimated Annual Pig Iron Production at Il'ich
1952, 1953

No. Blast Furnaces	Daily Capacity (MT)	Operating Days	Production (Thousand MT)
1	600	340	204
1	600	340	204
Total Pig Iron Production			408

f. Steelmaking Facilities.

Prewar. Before World War II, Il'ich Steel Plant had a total of 16 open-hearth furnaces, 10 of which were probably in Zavod B and 6, plus 1 8-MT Heroult electric furnace, were in Zavod A. Some information is available on individual open hearths, as follows:

Furnace Number	Hearth Area (Sq M)	Date Placed in Operation
4	20.75 to 25.0	23 November 1930
5	18.4 to 25.0	10 July 1933
12	32.0	28 March 1940

In addition to the above, the hearth areas of the other furnaces were known, as follows:

Number of Furnaces	Hearth Area (Sq M)
1	19.7
4	19.8
4	20.75
1	26.7
2	26.8
1	27.4

During World War II the open-hearth shops and installations suffered considerable damage, estimated to have been as high as 80 to 90 percent. 8/

Reconstruction Period. Restoration of steelmaking facilities at Il'ich began shortly after the Soviet recapture of the Ukraine.

One source claimed that in January 1947, 5 open-hearth furnaces and 1 electric furnace were in operation. Four of the furnaces which were in Zavod B had a capacity of 70 MT each, and were tapped twice each day. In Zavod A there was 1 small open hearth which had a capacity of 7 MT and which was tapped 3 times each day, and 1 5-MT electric furnace, which was tapped 4 times each day. This source estimated daily production of all furnaces at 600 MT.

By November 1948, no additional open-hearth furnaces had been placed in operation in Zavod B, but a second open-hearth building was nearing completion and one 150-MT furnace was being built. It was planned to have three additional furnaces finished by the end of April 1950, none of which had been started.

Early in 1949, raw steel production at Il'ich Steel Plant was estimated at 630 MT per day.

Little progress had been realized in the commissioning of open-hearth furnaces by the end of September 1949, when the last German prisoner of war left the area to be repatriated. From prisoner-of-war observations, it is believed that 5, and possibily 6, furnaces (open hearths Nos. 11 to 16) were in operation in Zavod B, and 1 small open-hearth furnace and an electric furnace were in production in Zavod A. All furnaces in Zavod B were oil (mazut) fired. Two cupola furnaces, each with a capacity of 40 to 50 MT per day, were in operation in the foundry, which produced molds, large gear wheels, bearings, and crane wheels for use in the plant. There were no Bessemer converters in the plant.

In September 1949, ingots were cast in two grades: raw steel for the rolling of construction materials used in the restoration and construction of the Il'ich plant, and raw steel for the production of armor plate, part of which was processed in the rolling mills of Zavod B and part of which was shipped by rail to an unknown destination. 9/

Improvements in Practices. In June 1947 it was announced that a movement for the speeding-up of processes of steelmaking in the Il'ich open-hearth shops had been inaugurated in May 1946. At that time the duration of a melt was reduced from a norm of 10 hours and 42 minutes to 7 hours and 55 minutes, and output was raised from a norm of 6.3 MT per square meter of hearth area to 10.1 MT. Using these practices, the production goal for the year had been reached on 7 November 1946, and 21,000 additional metric tons were produced over the plan by the end of the year. Far from damaging the furnaces, it was claimed that the new processes had resulted in the saving of 460 MT of refractory materials. It should be borne in mind that such production was achieved only occasionally.

In December 1948 it was announced that the steel coefficient of the open-hearth shops was fixed at 4.9 MT per square meter of hearth area. 10/

At Present. It is believed that the restoration of the open-hearth furnaces is complete, and that 16 open hearths with capacities of approximately 35 to 50 MT and 1 5- to 8-MT electric furnace are in production. In addition there is one small open-hearth furnace.

Estimated 1952 Steel Production at Il'ich*

No. Open Hearths	Hearth Area (Sq M)	Coefficient	Operating Days	Production (Thousand MT)
1	25.0	5.0	325	40.6
1	25.0	5.0	325	40.6
1	19.7	5.0	325	32.0
1	19.8	5.0	325	32.2
1	19.8	5.0	325	32.2
1	19.8	5.0	325	32.2
1	19.8	5.0	325	32.2
1	20.75	5.0	325	33.7
1	20.75	5.0	325	33.7
1	20.75	5.0	325	33.7
1	20.75	5.0	325	33.7
1	26.7	5.0	325	43.4

* See Appendix C, Methodology, for use of coefficient in estimating production.

Estimated 1952 Steel Production at Il'ich
(Continued)

No. Open Hearths	Hearth Area (Sq M)	Coefficient	Operating Days	Production (Thousand MT)
1	26.8	5.0	325	43.5
1	26.8	5.0	325	43.5
1	27.4	5.0	325	44.5
1	32.0	5.0	325	52.0
Total Open Hearth Steel Production				603.7
1 small open hearth with a daily capacity of 21 MT, 325 operating days, and production of				6.8
1 electric furnace with a capacity of 5 to 8 MT				5.0 to 8.0
Total Steel Production				615.5 to 618.5

Estimated 1953 Steel Production at Il'ich*

No. Open Hearths	Hearth Area (Sq M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
1	25.0	5.3	325	43.0
1	25.0	5.3	325	43.0
1	19.7	5.3	325	33.9
1	19.8	5.3	325	34.0
1	19.8	5.3	325	34.0
1	19.8	5.3	325	34.0
1	19.8	5.3	325	34.0
1	20.75	5.3	325	35.7

* See Appendix C, Methodology, for use of coefficient in estimating production.

Estimated 1953 Steel Production at Il'ich
(Continued)

No. Open Hearths	Hearth Area (Sq M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
1	20.75	5.3	325	35.7
1	20.75	5.3	325	35.7
1	20.75	5.3	325	35.7
1	26.7	5.3	325	46.0
1	26.8	5.3	325	46.1
1	26.8	5.3	325	46.1
1	27.4	5.3	325	47.2
1	32.0	5.3	325	55.1
Total Open-Hearth Steel Production				639.2
1 small open hearth with a daily capacity of 21 MT, 325 operating days, and production of				6.8
1 electric furnace with a capacity of 5 to 8 MT				5.0 to 8.0
Total Steel Production				651 to 654.0

g. Primary Rolling Facilities.

Prewar. In the years before World War II there was 1 2-high, reversible, 750-mm blooming mill at Il'ich, which had been placed in operation in 1933. Whether the blooming mill was located in Zavod A or Zavod B is not known. No information is available on the amount of damage sustained by the mill during World War II, but it is assumed to have been considerable. 11/

Reconstruction Period. Work was started on rebuilding the blooming mill, and in March 1945 it was announced that the Ural Machine Construction Plant had shipped a large reduction gear set to Il'ich. The gear wheel alone weighed 30 MT and the total weight of the equipment was 143 MT. The mill was in full operation in September 1949. 12/

At Present. One 2-high, reversible, 750-mm blooming mill or larger is in operation at Il'ich. Capacity of the mill is not known.

h. Finishing Rolling Facilities.

Prewar. The following finishing mills were in operation at Il'ich before World War II. There is no information available to indicate whether the mills were located in Zavod A or Zavod B.

One 3-high medium bar mill consisting of one 550-mm roughing stand and 3 450-mm finishing stands.

One 3-high, 700/460/700-mm 1 stand medium bar mill, No. 4, which was placed in operation in 1933. The mill was manufactured by "Lauta."*

One 3-high small bar mill consisting of a 450-mm roughing stand and 6 300-mm finishing stands.

One 3-high, 860/560/860-mm heavy plate mill, No. 1, which was placed in operation in 1933. It rolled armor plate and had an estimated yearly capacity of 100,000 MT.

One 3-high, 700/460/700-mm 1 stand light plate mill, No. 2, which was placed in operation in 1933. The mill was manufactured by "Lauta."*

One 3-high sheet mill, No. 3, consisting of 1 700/460/700-mm stand.*

One 2-high, 650-mm sheet mill, No. 5.

One sheet mill, No. 6, consisting of 2 4-high, 950/360-mm stands.

One sheet rolling mill for automobile sheet, which was placed in operation in 1934.

One stand, 1,250-mm heavy plate mill.

---

* According to report; however, it is possible that these 3 rolling mills are 1 and the same.

One 1,500-mm armor plate mill which rolled plate with an average length of 4,500 mm. This mill went into production in 1937.

One roll piercing mill.

No. 1 Pilger pipe mill for the production of 12-inch (in) pipe. Capacity was estimated at 100,000 MT per year. The mill went into production in 1933.

No. 2 Pilger pipe mill, also for the production of 12 in pipe. Capacity was estimated at 100,000 MT per year. The mill went into production in 1933.

No. 3 Pilger pipe mill for the production of 3-in pipe; the mill was completed in 1933.

No. 4 Pilger pipe mill for the production of 3-in pipe; the mill was placed in operation in 1933.

Four gas-welding pipe installations were completed in 1930.

Six gas-welding pipe installations, which went into production in 1930.

There is little information available on the amount of damage sustained by the finishing mills during World War II, but it is believed to have been considerable. 13/

Reconstruction Period. A medium plate mill and a light plate mill were reported to be in operation in April 1944. 14/

In August 1944 it was announced that Rolling Mill No. 4 had gone into production. Before World War II, No. 4 was a medium plate mill. 15/

Two sheet mills were in operation in September 1949. One was in Zavod A and rolled sheet approximately 3 mm thick. These sheets were taken to Zavod B where they were reduced to a thickness of 2 mm. 16/

One source claimed that a mill for the rolling of corrugated sheet was in operation in September 1949. 17/

The armor plate mill which rolled ship plate and tank plate was in operation in September 1949. One source claimed that there were 2 rolling mills in the building, 2 shears and 2 traveling cranes. Tank plate produced was 4 m long, 2 m wide, and 35 mm thick. It was claimed that 32 plates were rolled each 8-hour shift. 18/

Structural mills for the making of structural shapes existed in both Zavod A and Zavod B in September 1949. Products included I's, angles, T's, channels, and squares. 19/

In April 1944 a rolling mill for pipes of a large diameter for use of the petroleum industry was in operation in the Kuybyshev Pipe Mill. It is believed that this mill may have been one of the mills producing 12-in pipe before the war. In September 1945 the pipe bending shop was in operation. 20/ In August 1948 it was announced that a new department for the production of pipe with a special seam was under construction at Il'ich. The pipe was to be of large diameter, thin-walled, and was to be used for oil and gas pipelines. It was planned to have the new department in operation in 1949. 21/ In November 1948 it was announced that the Kuybyshev Pipe Works at Il'ich was being re-equipped and was supplying the oil industry with its products. 22/ Modernization and re-equipment of the mill was still going on in November 1949, when it was announced that 14 machine tools had been eliminated in the pipe mill and 4 high-powered units had been installed to do the same work. 23/

Oxygen bottles. Two small buildings in the pipe and tube mill area housed 4 seamless pipe machines which were producing oxygen bottles or tanks 130 cm high and 25 to 30 cm in diameter. The source claimed 500 bottles were produced each 8-hour shift. 24/

At Present. Since the departure of the last German prisoners of war in the fall of 1949, there has been no information to supplement the above information on finishing facilities at Il'ich.

i. Intraplant Services.

Electric Power. Only part of the electricity consumed by the Il'ich Steel Plant is generated in the plant area; the balance is received by high tension wires via Azovstal from Kurakhov power station, approximately 110 km to the north of Zhdanov. The Il'ich electric power station is northwest of the blast furnaces. There are two transformer stations within the plant area, one of which is located on the north side of the main railroad line and north of the power station. Electricity for running installations and machinery is 380-v, 3-phase AC, and that for lighting purposes is 220-v, AC. In late 1949 no electric power shortages were noticeable. 25/

Water Supply. The water pumping station had 2 steam piston-type pumps and 1 electric rotary pump in September 1949. Water came from outside the plant area and was pumped into 8 water towers, each with a capacity of 80 cu m. Because there was a shortage of fresh water, waste water was channeled into eight reservoirs for cooling and re-use. The pumping station at the reservoirs had three electric rotary pumps. 26/

Compressor Station. In late 1949 the air compressor station had 6 (another source claimed 4) piston-type compressors, electrically operated. Air was pumped into tanks through underground pressure lines, the main line of which was 30 cm in diameter and was 1.5 m underground. The tanks, made of riveted steel plates, were 1.5 m in diameter and 8 to 9 m high. 27/

Transportation Facilities. In November 1948 all parts of the plant were serviced by branch lines of the main Zhdanov-Stalino railroad, which skirted the east side of the plant area. There were good roads leading to Zhdanov and to Sawodskoi. 28/

Heating Plants. There were 2 heating plants in the area, each of which contained 7 boilers, coal-fired. Underground pipe lines led to the rolling mills. 29/

Storage Facilities. In November 1948 storage facilities for coal, coke, iron ore, and limestone were located south of the blast furnace site. Scrap was stored on the north side of the plant, just north of the open-hearth furnaces. 30/

Refractory Plant. In late 1949 there were 4 furnaces, 7 to 8 m high, for the production of dolomite crystals. Production was reported to be 16 MT per shift. 31/

A concrete block factory contained 2 mixers, 1 press and 4 drying ovens. 32/

A dolomite and silicate shop, with 2 furnaces 20 m high, burned coke and dolomite for use in the open hearths. 33/

A lime plant contained three kilns, and the product was used for flux in the open-hearth furnaces and for construction purposes. 34/

Apprentice Training School. A school for the training of apprentices was in operation in late 1949. 35/

j. Products and Production.

Products.

Prewar. Before 1930 production at Il'ich consisted almost exclusively of merchant bar steel. From 1931 on, the production of rolled products from quality steel produced at the plant began to rise.

Proportion of Products Made from Quality Steel to Total Rolled Products

Year	Percentage
1931	4.8
1932	19.8
1933	26.0
1934	29.0

The transition from the production of ordinary steel to quality steel necessitated some modernization and reconstruction of the plant. The Moscow Automobile Plant imeni Stalin, which in 1931 proceeded with the production of a new automobile, the AMO-Z, required sheet of higher quality. In order to produce the required grade, the annealing departments and the open-hearth shops were modernized, Rolling Mill No. 2 was electrified, and a second rolling mill for the production of sheet was placed in operation. In 1933 the rolling mill for the production of armor plate, reportedly the largest in the USSR, was modernized.

In 1935 the plant was practically the only mill in the country producing high-grade tubing from carbon steel and steel alloys. It was announced that 98 percent of the output of AS (a trade name) was shipped to a plant producing equipment for the oil industry. Production also included carbon and manganese steel for the shipbuilding industry, steel for boilers and locomotive chassis, and other special alloy steels. 36/ In 1941 the Il'ich Steel Plant was producing the following: pig iron; raw steel; spring steel; sheet metal for aircraft, automobiles, and tanks; armor plate; high grade tubing for chrome-nickel and chrome-molybdenum steel for aircraft; pipe up to 14 in in diameter; alloyed pipes and tubes for the petroleum industry. 37/

Reconstruction Period. The production of tank cars began late in 1946 or early in 1947. In June 1947 it was announced that the plant had recently started the production of tank cars -- the 5,000th car came off the line in May -- and that a new type of tank car would go into production in July. 38/

When the last contingent of German prisoners of war left in September 1949, the following were being produced at Il'ich: carbon steel; alloyed steel; steel plate, including ship and armor; steel sheet, including chrome-nickel; seamless tubes; welded pipe; structural shapes; steel castings; tank turrets; railroad tank cars; oxygen bottles. 39/

At Present. Although no information is available on the kinds of products produced at Il'ich at the present time, it is believed that the list of products is approximately the same as those produced in 1949 plus pig iron.

Production.

Production at Il'ich

	1934 40/	1935 40/	1941 41/	1949 42/	1952 43/	1953 43/
Pig Iron	180.5	307.4		0	408	408
Raw Steel	433	531.9		238 to 340	618	654
Rolled Products	286.1	350.4			400	470
Pipes and Casing			165			

k. Distribution.

The following items throw some light on the distribution of the products of Il'ich in the postwar years: In October 1946 the plant was sending casing, round bars, and angle iron to the Transcaucasus Metallurgical Plant, then under construction. 44/ In March 1947, Il'ich was in arrears in the delivery of tubes required by the Khar'kov Electro-Mechanical Works imeni Stalin, needed for the manufacture of explosive-proof electrical motors. 45/ In August 1947 the plant had not fulfilled an order for sheet metal for "Svet Shakhtera Zavod." 46/ In October 1948 all armor plate was shipped out of the plant to an unknown destination. Fifty percent of the other plate produced was used within the plant. 47/ During 1948 the Il'ich Steel Plant cooperated with Tank Plant No. 183 at Khar'kov, center of the Soviet tank industry. 48/ In September 1949, railroad tank cars assembled at Il'ich were sent to the Baku oilfields for use. 49/ In September 1950 the Kuybyshev Pipe Rolling Plant received an order to produce the first consignment of pipe for the Kuybyshev Hydroelectric Power Station. 50/ In May 1951, Il'ich was making shut-off devices and pipe for the main pump of the Tsymlyansk Power Station. 51/ In June 1951 the Kuybyshev Works sent a large shipment of oxygen containers to the Tsymlyansk Power Station. It was the 25th delivery made by the plant. 52/ In July 1951, Il'ich shipped one trainload of high-voltage pylons to the Kakhovka project. 53/ In August 1951 the plant completed the assembly of the first siphon spillway for the Volga-Don Canal. It was a large tunnel 10 m in diameter, and would carry water to the reservoir. 54/ In September 1951 a pipe line 3 m in diameter and 1,500 m long was completed. It was to be used in turning the flow of the Don River into the main pumping station. The plant was working on a large siphon for the waterworks. 55/

l. Plant Efficiency.

In June 1947 the plant was awarded the Order of Lenin for building railroad tank cars and for producing armor steel plate for T-34 tanks. 56/ The plant was also awarded a second class prize by VTsSPs (All Union Central Council of Trade Unions) and by the Ministry of Transportation Machine Building of the USSR for the April 1947 Socialist Competition. 57/

m. Administration.

In 1941 the Il'ich Steel Plant was under the direction of Trubostal. 58/ In mid-1947 the plant was under the administration of the Ministry of Transportation Machinery of the USSR for the production of tank cars and armor plate for T-34 tanks. 59/

n. Personnel.

Number of Workers. Reports of the numbers of workers at Il'ich vary from a few hundred to as high as 40,000. All sources agreed that three shifts were worked. In 1949 the following estimate, which is believed to be approximately correct was made of the number of workers:

Laborers, skilled and unskilled (50 percent women)	3,000
Laborers in plant engaged in transportation, including prisoners of war	800
Managerial and office personnel (75 percent women)	250
Total number of employees	4,050 60/

Administrative Personnel. In mid-1947 the Director of the Il'ich Steel Plant was Aleksandr Fomich Garmashov. 61/

In October 1948 the Director was reported to be (fnu) Halmoso. 62/

In June 1947 the Chief Power Engineer was Nikifor I. Demochko. 63/

In June 1948 the Director of the Kuybyshev Pipe Mill was (fnu) Kas'yanov. 64/

o. Locational Characteristics.

No information available.

B. Makeyevka Complex.

3. Makeyevka Metallurgical Plant imeni Sergei M. Kirov.

[redacted] 25X1A2g

a. Location.

48° 03'N - 37° 58'E. Makeyevka, Stalino Oblast, Ukraine SSR. The rail junction of Yasinovataya is approximately 7 km northwest of the plant, and the Mishino railroad station is approximately 2 km southeast. Approximately 500 m to the west of the plant site there is a lake, 250 to 300 m wide, which furnishes water for use of the plant. At the southern limit of the plant there is a coal mine. Blast furnaces are located at the southern side of the plant area and are separated from the steelmaking facilities by the electric power station. Two single track rail lines enter the plant area from the north and fan out into the site.

b. History and Development.

The construction of the first units of the Makeyevka Metallurgical Plant began in 1897 with the assistance of French engineers. Approximately 2 years later the plant was in operation under the direction of the General Corporation of the Iron and Steel Works of Russia. During the First Five Year Plan (1928-32) and Second Five Year Plan (1933-37) Makeyevka was modernized and expanded. Existing blast furnaces were mechanized with the latest type of blowers and automatic charging devices, and blooming mills, sheet and rail mills, and several technical shops were added to the existing installations. Under the plans the mill was to have a capacity of 2,240,000 MT of pig iron, 2,150,000 MT of ingot steel, and 1,820,000 MT of finished steel products, and it was to be one of the largest and most efficient steel plants in the USSR. 1/

Upon the approach of the German Army in the early days of World War II, precautions were taken by plant officials to deny the facilities of the mill to the Germans. Furnaces were left standing, but charges were allowed to freeze in the blast furnaces and open-hearths. In the new open-hearth plant, which was still under construction, the structure was blown in such a way as to collapse the roof into the furnaces. All electrical equipment and movable machinery was evacuated. The Germans had little success in reconstructing the ruins. Makeyevka was recaptured by the Red Army in September 1943, and restoration was begun immediately. Over-all destruction was estimated as ranging between 65 and 80 percent. 2/

By June 1946 the mill was estimated to have been operating at approximately 50 percent of its prewar capacity. It was the goal of the Fourth Five Year Plan to have Makeyevka fully constructed and in operation by the end of the plan. It is believed that the goal was achieved. 3/

c. Raw Materials and Other Inputs.

There is an abundance of raw materials within easy rail distance of the plant. Iron ore comes from Krivoy Rog and dolomite comes from the Nikitovka Dolomite Works. Manganese ore (25 to 40 percent Mn) comes from Nikopol' and Chiatura. 4/

d. Coal and Coke.

Coal. Three, and possibly more, coal mines are located in the immediate vicinity of the town of Makeyevka. Some coal is received also from the Donets Basin by rail. 5/

Coke. Metallurgical coke is shipped into the plant from coke-chemical plants in the vicinity of Makeyevka, Novo-Makeyevka, and Staro-Makeyevka. 6/

e. Ironmaking Facilities.

Prewar. In 1941 there were 5 blast furnaces in operation in Makeyevka, which had an estimated yearly capacity of 1,375,000 MT of pig iron. One blast furnace had a capacity of 1,163 cu m and was placed in operation in 1935. One blast furnace had a capacity of 1,143 cu m. Three blast furnaces had capacities of 842 cu m each. One source claimed that one of the smaller blast furnaces was used exclusively for the making of ferromanganese. Another source reported that this furnace was demolished and later rebuilt and enlarged for the production of pig iron. When Makeyevka was about to be overrun by the German Army in the early days of World War II, the Soviets allowed the molten metal in the blast furnaces to freeze. 7/

Reconstruction Period. Restoration of the blast furnaces began shortly after the recapture of the plant by the Red Army in September 1943. Blast furnace No. 2 was the first to be reconditioned, and it is reported to have been placed in operation before the end of 1943. It was announced that blast furnace No. 1, with a capacity of 1,180 cu m, was blown in on 1 January 1946, and that No. 3 and No. 4 were in the process of being reconstructed. There is no record of the completion of any blast furnaces during 1947. Several sources reported that blast furnace No. 3 was completed during 1948, and that No. 4 was scheduled for operation early in 1950. 8/ An unverified report claimed that one of the blast furnaces with a capacity of approximately 1,000 cu m was dismantled in 1949, and that it was to be replaced with a modern furnace with a capacity of 1,500 cu m. 9/ This information is not believed to be correct; the furnace probably was enlarged to 1,180 cu m.

Improvements in Practices. Before World War II, blast furnace linings lasted approximately 7 years, and the average time required for relining a furnace was approximately 60 days, although one source claimed that at times the repair period was reduced to as little as 35 days. 10/ In July 1946 it was announced that a new invention had been installed on one of the blast furnaces which permitted the removal of cooled metal more efficiently. Under the new system, drilling machines were used directly on the cooled metal and Amonal was placed into 24 electrically-drilled holes. The metal shattered by the detonation of the explosive was then extracted from the furnace by a special crane. 11/ In mid-January 1947, it was announced that the Nevskiy Machine Building Plant at Leningrad was making the latest type of turbomachinery for starting blast furnace blfowers, and that the first such device would be shipped to Makeyevka. 12/

A new world's record in pig iron production was claimed in July 1948 for 1 of the large blast furnaces at Makeyevka, which obtained 1.35 MT of pig iron for each cubic meter of furnace volume. 13/ In July 1949, blast furnace workers at Makeyevka pledged themselves to attain a blast furnace coefficient of 0.83 in the 15th Anniversary of Socialist Competition. 14/

Sintering Plant. An iron ore sintering plant was in production in November 1949. It contained 3 to 5 Dwight-Lloyd machines, each with a capacity of 5,000 MT of ore. 15/

In December 1949 a new method for regulating the operation of blast furnaces, which was developed by the Dnepropetrovsk Metallurgical Institute, was being used on blast furnace No. 1. 16/ In June 1950, it was announced that operators in the blast furnace department had attained a coefficient of 0.83 to 0.87 in the utilization of the furnaces. 17/ It was announced that from January to October 1952, blast furnace operators at Makeyevka obtained 1 ton of pig iron for each 0.87 cu m of usable space of furnace. 18/

At Present. Four blast furnaces are in operation at the Makeyevka Metallurgical Plant.

Estimated 1952 Pig Iron Production at Makeyevka*

No. of Blast Furnaces	Volume (Cu M)	Coefficient	Operating Days	Production (Thousand MT)
1	1,180	0.87	340	461.1
1	1,180	0.87	340	461.1
1	842	0.87	340	329.0
1	842	0.87	340	329.0
Total Pig Iron Production				1,580.2

* See Appendix C, Methodology, for use of coefficient in estimating production.

Estimated 1953 Pig Iron Production at Makeyevka*

No. of Blast Furnaces	Volume (Cu m)	Estimated Coefficient	Operating Days	Production (Thousand MT)
1	1,180	0.83	340	483.3
1	1,180	0.83	340	483.3
1	842	0.83	340	344.9
1	842	0.83	340	344.9
Total Pig Iron Production				1,656.4

f. Steelmaking Facilities.

Prewar. In 1941, steelmaking facilities at Makeyevka Metallurgical Plant consisted of 13 open-hearth furnaces, 1 Heroult electric furnace with a capacity of 3.5 MT, and 2 Bessemer converters, which had not been completed and placed in operation. The open-hearth furnaces were described as follows:

Four open hearths, each with a hearth area of 22.5 sq m, which had been placed in operation in 1934.

Two open hearths, each with a hearth area of 38.0 sq m, which had been placed in operation in 1934.

One open hearth with a hearth area of 44.4 sq m, which had been placed in operation in 1934.

Five open hearths, each with a hearth area of 61.5 sq m and a capacity of 150 MT, which had been placed in operation in 1933-1934.

One open hearth with a hearth area of 61.5 sq m, which had been placed in operation in 1935.

These furnaces had a rated capacity of 1.3 million MT per year. 19/

* See Appendix C, Methodology, for use of coefficient in estimating production.

Reconstruction Period. Production of steel was resumed at Makeyevka in the spring of 1944 with the operation of 4 open-hearth furnaces, which had a total hearth area of 177 sq m and a capacity of 270,000 MT per year. In September it was announced that five open hearths were in operation. In April 1945 it was stated that open hearths No. 1 and No. 2 in Open-Hearth Shop No. 1 would be in operation by the end of September. In October it was announced that the seventh open-hearth to be restored in Shop No. 1 was in operation and that the shop was restored completely. In February 1946 the 3.5-MT Heroult electric furnace was placed in operation. In May it was announced that 7 furnaces were in operation and that by the end of the year 3 more open-hearth furnaces would be commissioned.

In April 1947 it was stated that four open-hearths would be restored before the end of the year. In the spring of 1948 it was announced that 5 open hearths would be placed in operation by the end of the year and that Open-Hearth Shop No. 2 would be restored completely before the end of December. Several sources reported that the eighth open-hearth to be reconstructed went into operation in May 1948. In December 1948 it was announced that the ninth furnace had been restored in the record time of 40 days. Early in 1949 it was claimed that Open-Hearth Shop No. 1 contained 6 furnaces, 2 large and 4 small, and that 1 of the large furnaces was not yet in production. Shop No. 2 had 7 furnaces, 3 large and 4 small, all in operation, and a Bessemer converter.

In October 1952 it was announced that steel production at Makeyevka averaged 117,900 MT per furnace, or an estimated 1.5 million MT per year. 20/

Improvements in Practices. A few announcements from the press are available which are indicative of the efficient operation of steelmaking facilities at Makeyevka:

In September 1948 the planned steel coefficient of the open-hearth shops for the second half of the year was announced at 5.5 MT. 21/ In July 1948 the planned coefficient for Open-Hearth Shop No. 1 was 5.5 MT as compared to a standard coefficient of 4.65 MT, and for Shop No. 2, 5.25 MT as compared to a norm of 4.63 MT. 22/ In October 1948 the steel coefficient was announced at 5.4 MT as compared to a norm of 4.35 MT. 23/ In July 1949, workers pledged to attain a steel coefficient of 5.8 MT in

Open-Hearth Shop No. 1 and 5.3 MT in Shop No. 2, during the 15th Annual Socialist Competition. 24/

At Present. Thirteen open-hearth furnaces, 2 Bessemer converters, and 1 3.5-ton electric furnace are in operation at Makeyevka Metallurgical Plant.

Estimated 1952 Open-Hearth Steel Production at Makeyevka*

No. of Open-Hearths	Hearth Area (Sq M)	Coefficient	Operating Days	Production (Thousand MT)
1	22.5	5.4	325	39.5
1	22.5	5.4	325	39.5
1	22.5	5.4	325	39.5
1	22.5	5.4	325	39.5
1	38.0	5.4	325	66.7
1	38.0	5.4	325	66.7
1	44.4	5.4	325	77.9
1	61.5	5.4	325	107.9
1	61.5	5.4	325	107.9
1	61.5	5.4	325	107.9
1	61.5	5.4	325	107.9
1	61.5	5.4	325	107.9
1	61.5	5.4	325	107.9
Total Open-Hearth Steel Production				1,016.7

* See Appendix C, Methodology, for use of coefficient in estimating production.

Estimated 1952 Bessemer Steel Production at Makeyevka*

No. Bessemers	Estimated Capacity (MT)	Heats per Day	Operating Days	Production (Thousand MT)
1	15	25	300	112.5
1	15	25	300	112.5
Total Bessemer Steel Production				225.0
Estimated 1952 Electric Steel Production				3.5
Total Estimated 1952 Steel Production				1,245.2 MT

Estimated 1953 Open-Hearth Steel Production at Makeyevka*

No. of Open-Hearths	Hearth Area (Sq M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
1	22.5	5.8	325	42.4
1	22.5	5.8	325	42.4
1	22.5	5.8	325	42.4
1	22.5	5.8	325	42.4
1	38.0	5.8	325	71.6
1	38.0	5.8	325	71.6
1	44.4	5.8	325	83.7
1	61.5	5.8	325	115.9
1	61.5	5.8	325	115.9
1	61.5	5.8	325	115.9
1	61.5	5.8	325	115.9
1	61.5	5.8	325	115.9
1	61.5	5.8	325	115.9
Total Open-Hearth Steel Production				1,091.9

* See Appendix C, Methodology, for use of coefficient in estimating production.

Estimated 1953 Bessemer Steel Production at Makeyevka*

No. Bessemers	Estimated Capacity (MT)	Heats per Day	Operating Days	Production (Thousand MT)
1	15	25	300	112.5
1	15	25	300	112.5
Total Bessemer Steel Production				225.0
Total Electric Steel Production				3.5
Total Estimated 1953 Steel Production				1,320.4

g. Primary Rolling Facilities.

Prewar. Several allegedly authoritative sources, who appeared to have had wide experience in the rolling mill shops at Makeyevka, reported on mill installations. No two of these sources agreed completely. The following mills appear to have been in operation at the beginning of World War II: one 1,150-mm blooming mill whose annual production capacity was estimated at 1 million MT; one 5-stand 600-mm billet mill. 25/

Reconstruction Period. Except for the blooming mill, there is no information on the restoration of primary rolling mills at the plant. Housing for the reconstructed blooming mill was made by the Urals Heavy Machine Building Plant, and the rolling table, manipulators, and other machinery were built by the Novo-Kramatorsk Machine Building Plant. The blooming mill was placed in operation on 1 January 1947. It was announced that equipment included 32 soaking pits with automatically operated covers, each with a capacity of 4 or 5 ingots, and cranes with lifting capacities of 5 to 8 MT. The restored mill was to be operated by 80 workers per shift, including 2 engineers. 26/

At Present. Both the blooming mill and the billet mill are believed to be in operation at Makeyevka.

* See Appendix C, Methodology, for use of coefficient in estimating production.

h. Finishing Rolling Facilities.

Prewar. As stated above, sources did not agree on the number and kind of finishing mills at the plant. The following are believed to have been in operation:

One 4-stand, 3-high 660/630-mm bar mill;
One 4-stand, 630/600-mm bar mill;
One 450/850-mm continuous mill;
One 850-mm rail and structural mill;
One 250/350-mm wire mill;
Four rotary furnaces for casting pipe, which had yearly capacity of 50,000 MT; and
Four rotary furnaces for casting pipe, which were still under construction.

Other installations reported included a 350-mm medium bar mill; a 330-mm small bar mill; a skelp mill of 11 stands which reportedly had a production capacity of 250,000 MT per year; and a forge and press shop, which had a 1,000-ton hydraulic press. There are no confirmations for these finishing mills. 27/

Reconstruction Period. By May 1946, 3 rolling mill units were in operation, and it was planned to have 6 more in commission by the end of the year. Some of these mills may have been primary mills. 28/

It was announced that rolling mill No. 3, which produced rails, wire, and angles, was awarded the second prize in the All-Union Competition for June 1946 by the VTsSPs (not further identified) and the Ministry of Ferrous Metallurgy. 29/

In early 1949, rolling facilities at Makeyevka were reported to consist of 4 departments, housed in 2 buildings, and all were in full operation. 30/ The old rolling mill building housed Rolling Mills Nos. 3 and 4. No. 3 produced rails and angles and had an estimated annual capacity of 180,000 MT. No. 4 produced sheet and plate, and its daily output at the end of 1947 consisted of 200 to 250 plates. 31/ The new rolling mill building, construction of which had begun before World War II, housed Rolling Mills Nos. 1 and 2. No. 1 was the blooming mill. There is no information on the functions of No. 2. 32/ Rolling Mills Nos. 2, 3, and 4 were estimated to have a combined annual capacity of 400,000 MT. 33/

At Present. It is estimated that the finishing mills which were in existence before World War II have been reconstructed and are in full operation. Some new facilities may have been added. In February 1951, it was announced that production had begun in a new type of corrugated steel, which had a rough surface for stronger ferroconcrete structures. 34/

i. Intraplant Services.

Electric Power. The Makeyevka Metallurgical Plant power station, which was reported to have had a prewar capacity of 25,000 kw, was salvaged and put back into operation in May 1946. Apparently insufficient amounts of power were generated in the plant and output had to be supplemented from outside sources, the origin of which had not been determined. One source reported additional power came from Zaporozh'ye, another claimed Zugres, a plant located on the Nizhnyaya Krynka River, 23 km to the east; and another stated that the mill transformer station received power from the Gorlovka Thermal Power Station. Prewar electric power production was reported to be 192 million kwh per year. 35/ Power for lighting purposes was reported in November 1936 to be 220 v DC, and that for the running of machinery and equipment was 380 v. 36/ On 1 January 1948 it was announced that a large steam turbine was shipped to Makeyevka by the Nevskiy Mashinustroilel'nyy Zavod. 37/

Water Supply. The source of the plant's water supply is a large lake, 250 to 300 m wide, located approximately 500 m west of the plant site. Within the plant area there is a reservoir approximately 700 sq m in size where water is sprayed to cool it for use in the furnaces. There is a 10 to 12 percent loss of water in the cooling process. 38/

Sintering Plant. An iron ore sintering plant with 3 to 5 Dwight-Lloyd machines, each with a capacity of 5,000 MT of ore was restored and in operation in November 1949. 39/

Training School. In November 1946 a school for the training of apprentices was in operation. Boys 16 to 20 years of age were accepted for training and were required to sign up for

4 years work in the plant following the completion of the course. There were approximately 40 instructors in the school. Four hours each day were spent on theory and 4 hours on practice throughout the various departments of the plant. The source estimated 3,000 in training at the time of observation. 40/ A plant training school was also conducted for the benefit of older, experienced workers at Makeyevka. Courses ran from 6 to 12 months. 41/

j. Products and Production.

Products. Products at Makeyevka Metallurgical Plant include:

Metallurgical Coke	Electric Steel	Armor Plate
Coke byproducts	Blooms and Billets	Rails and Accessories
Pig Iron	Bars	Axles
Open-Hearth Steel	Rods	Wire
Bessemer Steel	Structural Shapes	Iron Pipe 42/
Forgings		

Production at Makeyevka

Thousand Metric Tons

	1934	1936	1940	1944	1949	1952	1953
Pig Iron	822.9 43/	1,316.0 43/	1,115.0 45/	306.0 45/	750 to 800.0 46/	1,580.0 47/	1,656.4 47/
Steel	570.2 43/	868.0 43/	1,088.0 45/	195.0 45/	1,000.0 46/	1,245.0 47/	1,320.4 47/
Rolled Products	448.2 43/	668.3 43/ 1,069.0 44/	1,017.0 45/	99.0 45/	400.0 46/	896.0 47/	950.6 47/

k. Distribution.

In August 1947 it was announced that Makeyevka was working on an order of sheet metal for "Svet Shakhtera Zavod." 48/

In July 1950, window frame steel for a Moscow skyscraper and the first 300 MT of metal for use in the construction of the Moscow State University were being produced. 49/ It was announced in January 1951 that rolled metal for use in the building of the Volga-Don Canal had been shipped. 50/ In April 1951, Makeyevka received an order for 120 MT of lining and 12 MT of facing for the Volga-Don Canal. 51/

In October 1951 it was announced that Makeyevka had received an order from the Volga-Don Canal for 5,500 MT of structurals, 1,300 MT of which were shipped in September and 2,500 MT in October. 52/

1. Plant Efficiency.

The following miscellaneous reports throw some light on the efficiency of Makeyevka:

The press carried an article in 1947 which claimed that the plant did not work efficiently during the first quarter of 1946. In the winter months special difficulties were experienced due to the poor work of the transportation shop. 53/

In July 1948 the plant was awarded the Council of Ministers' Red Banner in the All-Union Competitions as the best blast furnace plant in the USSR. 54/

Early in January 1949 it was announced that the plant's efficiency in the utilization of blast furnaces and open hearths had increased, but that the steel produced fell short of the standards set by the 1948 Conference of Metallurgists of the Southern and Central USSR. 55/

In July 1949 it was claimed that there were intolerable delays in production at Makeyevka: (1) workers without justification were not fulfilling pledges, (2) the quality of products was low, and (3) incoming iron ore was being charged into blast furnaces without being graded and sorted. 56/

In 1948 the Makeyevka plant achieved a fuel saving of 10,000 MT. "Gosinspektsiya" (State Inspector) of "Gosnab" (State Committee of the Council of Ministers of the USSR for Material Technical Supplies to the National Economy) found in the first quarter of 1948 that the metallurgical enterprises had not instituted sufficient control of the consumption of fuel. Failure of Makeyevka to observe correct heating procedures in open-hearth furnaces had lengthened the melt by over 30 minutes. Ingots brought from the open hearths to the stripping department at a temperature of 1,200 to 1,300 degrees were allowed to over-cool and were taken to the rolling mills at temperatures of 600 to 700 degrees, resulting in a loss of 18,000 MT of fuel per year. Also at Makeyevka, losses of high-calorific coke gas amounted to more than 6 percent as compared to a planned loss of 1.5 percent. Gas tanks for holding surplus coke gas had not been restored, and much gas had been lost by gas-main leaks. Several measures were introduced in 1948-49 which resulted in considerable reduction in fuel consumption and included: (1) utilization of the heat of waste gases from the soaking pits, (2) introduction of flameless combustion of gas-generating fuel, and (3) introduction of automatic regulation of furnace installations. 57/

In April 1950, Makeyevka Metallurgical Plant was listed among the southern plants which failed to meet plans for the first quarter of 1950. It was claimed that the plant was poorly prepared for winter operations in that it did not have adequate transportation, which resulted in irregular deliveries of supplies to the blast furnaces and open hearths. Difficulty was experienced in unloading frozen ores, and it was claimed that precautions should have been taken to prevent this by constructing temporary enclosures. 58/ In May 1950 during a three-day conference at Stalino, the Minister of the Metallurgical Industry of the USSR criticized 4 plants for decreased production levels during the first 4 months of 1950. It was charged that blast furnace operators at Makeyevka had not met quotas. The Chief Foreman of Makeyevka, I.G. Korobov, said workers failed to correct technical procedures or to demand the best from enterprises furnishing raw materials to the plant. 59/ Blast furnace in 1950 were charged with consuming 67 kg more of coke per ton of pig iron produced than was normal. 60/

In the postwar Five Year Plan it was claimed that Makeyevka had mechanized more than 300 production sectors of the plant, which resulted in the release of 750 workers for use in other parts of the mill. 61/

m. Administration.

In the early days of the operation at Makeyevka, the plant was under the direction of the General Corporation of Smelters, Iron and Steel Works of Russia. In 1941 the steel mill was administered by the Peoples' Commissariat for Ferrous Metallurgy. At the present time the Makeyevka Steel Plant is directed by the Ministry of Ferrous Metallurgy. 62/

n. Personnel.

Number of Employees. Three shifts per day, 7 days per week are worked at Makeyevka. The number of workers is as follows:

Year	Number
1914	1,800 63/
1937	22,000 64/
1941	15,000 65/
1944	10,000 plus 8,000 construction workers. 66/
1947	7,000 plus 800 German prisoners of war. 67/
1948	20,000 to 22,000, including 1,000 German prisoners of war. 35 to 50 percent were women. 68/
1949	20,000 to 30,000 69/
1953	25,000 70/

The last group of German prisoners of war left Makeyevka on 19 October 1949. 71/

Administrative Personnel. The following individuals held supervisory positions in the Makeyevka Steel Plant:

In April 1950 the Director of Makeyevka was I.F. Belobrov, reported a confirmed Communist. 72/

In November 1949 the Assistant Director was (fnu) Kachinko. 73/

In November 1949 the Director of Personnel was (fnu) Libidinsky (or Labedinski), reported a confirmed Communist. 74/

In June 1950 the foreman was I.G. Korobov. 75/

In January 1947 the Chief of the Rolling Mills was A.I. Zhukov. 76/

o. Locational Characteristics.

The Makeyevka Steel Plant is surrounded by a fence approximately 2 m high. Special passes are required for admittance to the plant area. 77/

25X1A2g

4. Novo Makeyevka Coke-Chemical Plant No. 4 [redacted]

25X1A2g [redacted]

a. Location.

48° 03'N - 37° 57'E. Makeyevka, Stalino Oblast, Ukraine SSR. The plant is located southeast of the Makeyevka Metallurgical Plant imeni Sergei M. Kirov. 1/

b. History and Development.

Novo Makeyevka Coke-Chemical Plant was in operation before World War II. When the Germans occupied the plant in October 1941, it was found that much of the plant equipment had been evacuated to the Urals by the Soviets. When the Germans left, the power house and the quenching towers were destroyed. All four coke batteries and the chemical installations were restored and in operation by the end of 1948. 2/

c. Raw Materials and Other Inputs.

No information available.

d. Coal and Coke.

Coal. Coal is received from several coal mines in the Makeyevka area. A belt conveyer carries coal from the Sofia mine to the coke ovens. 3/

Coke. Severe damage was sustained by the plant during World War II. Reconstruction began early in 1946. In May 1946, workers at the plant pledged themselves to restore the coke ovens completely and to attain prewar production levels by the end of 1948. It was planned to have coke battery No. 1 in operation in 1946 along with coal tower No. 1, new sedimentation tanks, and a new sulfate plant. It was promised also that: (1) the coal concentration process and the quality of the coal would be improved with the ash content reduced to 9.6 percent; (2) the steel plant Kirov would be furnished with 16,000 cu m of gas per hour; (3) the raw benzol yield would reach 0.8 percent; and (4) ammonium sulfate would be produced. 4/

A description of the plant, made in early 1952, follows:

Number of Coke Batteries	4
Number and Type of Coke Ovens	184 Koppers
Volume of Oven (Cu M)	18.7
Width of Oven (MM)	400
Normal Coking Time (Hours)	15.7
Coal Charge per Oven, Dry Basis (MT)	14.0
Total Daily Carbonization Capacity (MT)	3,938
Annual Carbonization Capacity (MT)	1,417,680
Annual Coke Capacity, Dry Basis (MT)	1,077,437
Annual Coke Capacity, Moist Basis (MT)	1,100,000
Refined Benzene Capacity (MT per Year)	8,910
Refined Toluene Capacity (MT per Year)	2,090
Crude Tar Capacity (MT per Year)	41,304
Ammonium Sulfate Capacity (MT per Year)	14,619

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

None.

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

None.

i. Intraplant Services.

No information available.

j. Products and Production.

The plant produces metallurgical coke, benzene, toluene, crude tar, and ammonium sulfate. 5/

Metallurgical coke production in 1952 and in 1953 is estimated at 1.1 million MT. 6/

k. Distribution.

Coke gas and metallurgical coke is shipped to the Makeyevka Metallurgical Plant imeni Kirov. 7/

l. Plant Efficiency.

In July 1946 the coke section of Novo Makeyevka was awarded the first premium by the VTsSPs and the Ministry of Ferrous Metallurgy in the All-Union Competition among ferrous metallurgical enterprises for June 1946. 8/ Coke yield was approximately 77 percent in 1952.

m. Administration.

The plant is believed to be under the direction of the Ministry of the Chemical Industry. 9/

n. Personnel.

In July 1948 the Director of the Novo Makeyevka Coke-Chemical Plant was (fnu) Golubchik. 10/

o. Locational Characteristics.

No information available.

5. Staro Makeyevka Coke-Chemical Plant No. 5.

25X1A2g [redacted].

a. Location.

48° 02'N - 37° 57'E. Makeyevka, Stalino Oblast, Ukraine SSR. The coke plant lies southwest of the Makeyevka Metallurgical Plant imeni Sergei M. Kirov. 1/

b. History and Development.

The plant was in operation in 1921. During World War II considerable damage was sustained, but by early 1949 reconstruction was completed. 2/

c. Raw Materials and Other Inputs.

No information available.

d. Coal and Coke.

Coal. Coal is received from mines in the immediate vicinity of Makeyevka. 3/

Coke. There are in operation at the plant four coke batteries which were described in early 1952 as follows:

Number and Type of Batteries	4 Semet Solvay
Total Number of Coke Ovens	242
Annual Coke Capacity, Dry Basis (MT)	388,000
Annual Coke Capacity, Moist Basis (MT)	400,000
Refined Benzene Capacity (MT per Year)	3,240
Refined Toluene Capacity, (MT per Year)	760
Crude Tar Capacity (MT per Year)	15,020
Ammonium Sulfate Capacity (MT per Year)	5,316 4/

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

None.

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

None.

i. Intraplant Services.

No information available.

j. Products and Production.

Staro Makeyevka Coke-Chemical Plant produces metallurgical coke, benzene, toluene, crude tar, and ammonium sulfate.

Production in 1952 is estimated at 400,000 MT. 5/ No increase in production is estimated for 1953.

k. Distribution.

Coke is believed to be shipped to the Makeyevka Metallurgical Plant imeni Kirov. 6/

l. Plant Efficiency.

In July 1952 it was announced that Staro Makeyevka Coke-Chemical Plant had fulfilled the production plan for the first half of 1952 on 28 June 1952. 7/

m. Administration.

The plant is believed to be under the direction of the Ministry of the Chemical Industry. 8/

n. Personnel.

In July 1948 the director of the plant was (fnu) Glazunov. 9/

o. Locational Characteristics.

No information available.

C. Stalino Complex.

25X1A2g

6. Chumakovo Coke-Chemical Plant. [redacted]

a. Location.

47° 57'N - 37° 52'E. Chumakovo, near Stalino, Stalino Oblast, Ukraine SSR.

b. History and Development.

No information available.

c. Raw Materials and Other Inputs.

No information available.

d. Coal and Coke.

Coal. No information available.

Coke. Only two press items are available on the Chumakovo Coke-Chemical Plant. In June 1948 the name of the plant was included in a list of enterprises which had pledged to increase production; and in July 1948 it was announced that the plant workers had promised to dress 150,000 MT more of run-of-the mine coal than called for by the plan in the last half of 1948, and to raise the yield in such dressing by 3.5 percent. 1/

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

None.

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

None.

i. Intraplant Services.

No information available.

j. Products and Production.

No information available.

k. Distribution.

No information available.

l. Plant Efficiency.

No information available.

m. Administration.

No information available.

n. Personnel.

In mid-1948 the director of the plant was (fnu) Rodyakhin. 2/

o. Locational Characteristics.

No information available.

7. Mushketovo Coke-Chemical Plant No. 9 (Shirokovskiy Coke Chemical Plant). [redacted] 25X1A2g

a. Location.

47° 48'N - 37° 50'E. Stalino, Stalino Oblast, Ukraine SSR. The coke plant is located in Mushketovo, a suburb in the southeast part of Stalino.

b. History and Development.

Mushketovo Coke-Chemical Plant was in operation before 1925. It was reported to consist of 406 coke ovens, with a total capacity of 2,609 cu m. Another source reported 4 batteries with a total of 98 Coppee-type ovens in 1935. In 1936, reconstruction of two coke batteries was planned. The exact number of batteries in operation before World War II is not known. Considerable damage was suffered by the plant during the war, but there is little information available on postwar reconstruction. 2/

c. Raw Materials and Other Inputs.

No information available.

d. Coal and Coke.

Coal. Coal is received by rail from nearby mines. 3/

Coke. It is believed that two batteries of coke ovens are in operation at the present time at Mushketovo. Capacities have been estimated as follows:

Number and Type of Batteries	2 Coppee
Number of Coke Ovens	76
Annual Coke Capacity, Moist Basis (MT)	150,000
Refined Benzene Capacity (MT per Year)	1,215
Refined Toluene Capacity (MT per Year)	285
Crude Tar Capacity (MT per Year)	5,633
Ammonium Sulfate Capacity (MT per Year)	1,993 4/

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

None.

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

None.

i. Intraplant Services.

No information available.

j. Products and Production.

Metallurgical coke, benzene, toluene, crude tar, and ammonium sulfate are produced at the plant. 1952 coke production is estimated at 150,000 MT. 5/ No increase in production is estimated for 1953.

k. Distribution.

No information available.

l. Plant Efficiency.

In 1940 it was announced that pitch had been added to poor coking coal at Mushketovo and that the Khar'kov iron foundry had used the product in the production of iron castings. 6/

m. Administration.

The plant is probably under the direction of the Ministry of the Chemical Industry. 7/

n. Personnel.

In 1948 the plant director was (fnu) Lipatov. 8/

o. Locational Characteristics.

No information available.

8. Novo Smol'yaninov Coke-Chemical Plant. [redacted]

a. Location.

48° 00'N - 37° 45'E. Stalino, Stalino Oblast, Ukraine SSR. The coke plant is on the main road, Stalino Dnepropetrovsk, approximately 3 km southeast of the main Stalino railroad station. 1/

b. History and Development.

The coke-chemical plant, consisting of four batteries, was in operation before World War II. Considerable damage was sustained during the war years, but by early 1949 reconstruction was completed. 2/

c. Raw Materials and Other Inputs.

No information available.

d. Coal and Coke.

Coal. Coal is received from mines in the vicinity of Stalino. 3/

Coke. Reconstruction of facilities at Novo Smol'yaninov began shortly after Soviet reoccupation of the plant site. By 1 July 1948, No. 1 and No. 3 coke batteries were back in operation, and it was announced that 2 more batteries and auxiliary equipment would be placed in operation before the end of the year. Prisoners of war reported four batteries and the chemical plant in operation in 1949. An estimate of capacities of facilities at Novo Smol'yaninov was prepared in early 1952:

Number of Batteries	4
Number of Coke Ovens	190
Coal Charge per Oven, Dry Basis (MT)	15.0
Annual Coke Capacity, Moist Basis (MT)	640,000
Refined Benzene Capacity (MT per Year)	5,185
Refined Toluene Capacity (MT per Year)	1,216
Crude Tar Capacity, (MT per Year)	24,032 4/

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

None.

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

None.

i. Intraplant Services.

No information available.

j. Products and Production.

The Novo Smol'yaninov Coke-Chemical Plant produces metallurgical coke, benzene, toluene, and crude tar. Metallurgical coke production in 1953 is estimated at 640,000 MT. 5/

k. Distribution.

In July 1948 it was announced that metallurgical coke would be supplied to the nearby Stalino Metallurgical Works. 6/

l. Plant Efficiency.

No information available.

m. Administration.

The plant is believed to operate under the direction of the Ministry of the Chemical Industry. 7/

n. Personnel.

No information available.

o. Locational Characteristics.

No information available.

25X1A2g 9. Rutchenkovo Coke-Chemical Plant No. 2 imeni Kirov. [redacted]

a. Location.

47° 58'N - 37° 45'E. Stalino, Stalino Oblast Ukraine SSR. The plant site is in the suburb of Rutchenkovo, approximately 5 km southwest of the center of Stalino. 1/

b. History and Development.

Four batteries of 140 Coppee-type ovens, each with a useful volume of 11.45 cu m, were placed in operation in 1915. Three batteries of 142 Otto-type ovens, each oven with a useful volume of 16.63 cu m, were completed in 1928-31. During World War II, the installation suffered considerable damage, estimated by one source to be 80 percent. Reconstruction began with the German withdrawal from the Ukraine, and by October 1946 the seventh and last coke battery was back in operation. 2/

c. Raw Materials and Other Inputs.

No information available.

d. Coal and Coke.

Coal. Coking coal is received from mines in the immediate vicinity of the plant. 3/

Coke. The following estimate of present facilities at Rutchenkovo Coke-Chemical Plant was made in 1952:

Number and Type of Batteries	4 Otto	3 Coppee	
Number of Coke Ovens	142	140	
Volume of Oven (Cu M)	19.2		
Width of Oven (MM)	400		
Normal Coking Time (Hours)	15.7	30.0	
Cold Charge per Oven, Dry Basis (MT)	14.5	8.5	
Total Daily Carbonization Capacity (MT)	3,148	893	
Annual Carbonization Capacity (MT)	1,133,280	321,480	
Annual Coke Capacity, Dry Basis (MT)	846,093	244,300	
Annual Coke Capacity, Moist Basis (MT)			1,100,000
Refined Benzene Capacity (MT per Year)			8,910
Refined Toluene Capacity (MT per Year)			2,090
Crude Tar Capacity (MT per Year)			41,304
Ammonium Sulfate Capacity (MT per Year)			14,619 4/

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

None.

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

None.

i. Intraplant Services.

Electricity and steam are furnished by the local power system. 5/

j. Products and Production.

Rutchenkovo Coke-Chemical Plant produces metallurgical coke, benzene, toluene, crude tar, and ammonium sulfate. 1952 metallurgical coke production is estimated at 1,100,000 MT. 6/ No increase is estimated for 1953.

k. Distribution.

Metallurgical coke is shipped to the Stalino, Zhdanov, Makeyevka, and Dnepropetrovsk steel plants. 7/

l. Plant Efficiency.

It was announced that the plant had fulfilled the 1946-50 Five Year Plan. 8/

m. Administration.

The coke plant probably operates under the direction of the Ministry of the Chemical Industry. 9/

n. Personnel.

In July 1948 the director of the plant was (fnu) Balanov. 10/

o. Locational Characteristics.

No information available.

10. Stalino Iron and Steel Works imeni I.V. Stalin. (Yusovka Iron and Steel Works; Bolshevik Iron and Steel Works; Pednazedieled Steel Factory).

25X1A2g [redacted]

a. Location.

45° 58'N - 37° 48'E. The plant is located in the city of Stalino, Stalino Oblast, Ukraine SSR. The city of Stalino was formerly called Yusovka. The steel mill lies south of the city, southeast of the main railroad station, and is bounded on all sides by residential areas. It lies close to the Kal'mius River. 1/

b. History and Development.

The Stalino Iron and Steel Plant was constructed in 1869 under English supervision, and was placed under the management of the former Novorossisk Corporation for Coal Mines, Iron Rolling Mills, and Rail Mills. Until 1922 only merchant sheet and rails were produced. In that year a small amount of quality steel was produced, the output of which increased annually. In 1932 the production of rails was discontinued.

During 1933 through 1937 the entire mill was reconstructed, modernized, and expanded to a rated capacity of 800,000 MT of pig iron, 400,000 MT of steel, and 455,000 MT of rolled products. Installations included five new open-hearth furnaces and a rolling mill section in which was installed an antiquated blooming mill.

The plant sustained heavy damage during World War II. In the face of the German advance, the USSR allowed heats to freeze in all furnaces; some installations were blown; and all small tools, machinery, and electrical equipment were removed from the site. As the Germans retreated, thorough blasting was done, and it was estimated that the following damage took place:

Blast Furnace Section	88.6 percent
Open-Hearth Section	51.3 percent
Bessemer Converters	99.0 percent
Rolling Mill Section	40.3 percent

Approved For Release 1999/09/02 : CIA-RDP79-01093A000600010003-9

Agglomeration Mill	72.0 percent
Electrical Power Equipment	80.0 percent

Restoration began immediately following the retaking of the area by the USSR, and by 1944 the following had been placed in operation: 2 blast furnaces, 2 open hearths, 2 Bessemer converters, the blooming mill, the 800-mm and the 550-mm rolling mills, two dynamos, and the steam turbines and blowers. Reconstruction was estimated to be 35 to 50 percent complete by the end of 1944. It was planned to have 4 large blast furnaces, 8 open-hearth furnaces, and 6 rolling mills in operation by the end of 1950. 2/

c. Raw Materials and Other Inputs.

At the present time, raw materials are coming from the following sources:

Iron ore by rail from Krivoy Rog and the Urals,
Limestone from Nikilovka,
Coke from the plant ovens and from Rutchenkovo,
Gas by pipeline, 1.20 m in diameter, from the Rutchenkovo Coke Plant,
Manganese from Nikopol', and
Iron pyrites from Hungary.

A crusher pool in the slag pit crushes slag, which still contains iron, with a magnetic crane and a steel block. The iron is remelted for use. 3/

In July 1944, in a Berlin, Germany, railroad station a train was observed which consisted of 49 cars loaded with boiler equipment, tubes, pipes, superheater elements, and the like. The destination was the Stalino Iron and Steel Works. 4/

In November 1949, 3 trains of 30 cars each brought iron ore from Krivoy Rog each day. Every 2 days, 120 MT of manganese ore arrived by rail.

d. Coal and Coke.

Coal. Coal mines are located in the immediate vicinity of the plant area. In 1949 1 shaft was damaged and out of operation, but new shafts were under construction, 1 of which was in operation later in the year. Coal output is supplemented by rail shipments from the Donets Basin. 5/ The boiler plant received 540 MT of coal daily for the making of steam in November 1949. 6/

Coke. Stalino has its own coke-chemical plant, which is located on the southern edge of the city. In 1949 this plant was estimated to produce approximately 25 percent of the steel plant's requirements, and output was supplemented by shipments from the Rutchenkovo Coke-Chemical Plant, located a short distance away. 7/ In 1949, workers at the coke plant and in the blast furnace department of the steel mill developed a method of making coke from gas coal instead of from the high grade coal. The coke was used in charging blast furnaces No. 1 and No. 2, and it was claimed that pig iron production was increased 5 percent. 8/

An estimate of coke-chemical production at Stalino, made by an authoritative source in 1952, is as follows:

Number and Type of Batteries	1 Becker
Number of Ovens	47
Volume of Ovens (Cu M)	19.8
Width of Oven (MM)	406.0
Normal Coking Time (Hours)	16
Coal Charge per Oven, Dry Basis (MT)	15.0
Total Daily Carbonization Capacity (MT)	1,058.0
Annual Carbonization Capacity (MT)	380,880
Annual Coke Capacity, Dry Basis (MT)	289,469
Annual Coke Capacity, Moist Basis (MT)	300,000
Refined Benzene Capacity (MT per Year)	2,430
Refined Toluene Capacity (MT per Year)	570
Crude Tar Capacity (MT per Year)	11,265
Ammonium Sulfate Capacity (MT per Year)	3,987 9/

e. Ironmaking Facilities.

Prewar. Five blast furnaces were in operation at Stalino until the area was overrun by the German Army:

Two blast furnaces having a capacity of 627 cu m each,
One blast furnace having a capacity of 565 cu m, and
Two blast furnaces having a capacity of 450 cu m each.

It was estimated that the blast furnace section of Stalino was 88.6 percent destroyed at the end of the war. 10/

Reconstruction Period. Reconstruction of the blast furnaces at Stalino began shortly after the USSR recaptured the plant. In April 1944, one furnace was in operation, and a second furnace was placed in production by the end of the year. Blast furnace No. 1, the third to be rebuilt, was completed in June 1948. Some changes took place during 1949; by the end of the year, No. 1, No. 2, and No. 3 were equipped with automatic controls and modern measuring devices. In 1949, progress was claimed in the quality of the pig iron produced through improvements in the blending of ores, changes in burdening practices, and the elimination of impurities. Blast furnace No. 4 was completed and ready for final tests in November 1949. 11/

Improvements in Practices. On 26 November 1949 it was announced that the Dnepropetrovsk Metallurgical Equipment Plant had started the production of new welded 50-ton ladles for pig iron, the first of which had been shipped to Stalino. 12/ In December 1949 it was announced that workers had developed a new method for repairing Cowper stoves which cut the repair time from 2 months to 2 weeks. 13/ In March 1950 an experimental method for smelting pig iron from magnesium slag was introduced into the Stalino Works by Academician M.V. Lugovtsev, Director of Ferrous Metallurgy at the Ukrainian Academy of Science. 14/ In February 1950 it was claimed that the blast furnaces were averaging 1 MT of pig iron for each 0.97 cu m of furnace volume. In May 1951 the blast furnace coefficient reached 0.89 as compared to a norm of 0.96. The blast furnace shop at Stalino was considered among the most efficient in the USSR, and won first place in the All-Union Competition of Metallurgical Combines for the first quarter of 1951. 15/ In November 1953 it was announced that the 1952 blast furnace coefficient was 0.88 and that the 1953 coefficient was 0.85. 16/

At Present. Four modern blast furnaces, Nos. 1 through 4, are in operation at Stalino. Volumes of furnaces by blast furnace number are not known, but the following size furnaces are believed to be in production. 17/

Estimated 1952 Blast Furnace Steel Production at Stalino*

Volume (Cu M)	Coefficient	Operating Days	Production (Thousand MT)
627	0.88	340	242.6
627	0.88	340	242.6
565	0.88	340	218.3
450	0.88	340	173.8
Total Pig Iron Production			877.3

Estimated 1953 Blast Furnace Steel Production at Stalino*

Volume (Cu M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
627	0.85	340	250.8
627	0.85	340	250.8
565	0.85	340	226.0
450	0.85	340	180.0
Total Pig Iron Production			907.6

* See Appendix C, Methodology, for use of coefficient in estimating production.

f. Steelmaking Facilities.

Prewar. There were eight open-hearth furnaces in operation at the steel works in 1941. No. 8 open hearth was fired in 1941, and it was claimed it had a rated capacity of 130 to 160 MT and that it was slightly larger than the existing furnaces, which had capacities of 90 to 120 MT. Two sources, however, reported the following sizes:

Number of Furnace	Hearth Area (Sq M)
3	45.6
1	42.4
4	35.7

In addition to the open-hearths, there were 2 to 4 Bessemer and/or Thomas converters.

At the time of Soviet reoccupation of the area, it was estimated that damage to the open hearths amounted to 51.3 percent and that the converters were 99 percent destroyed. 18/

Reconstruction Period. Restoration of open hearths at Stalino kept pace with the rebuilding of blast furnaces. By 1946, four open hearth furnaces had been rebuilt. On 27 October 1948, open-hearth No. 5, completely automatic and with a rated capacity of 80,000 MT per year, was placed in production. At approximately the same time, two of the existing furnaces were being reconstructed to operate automatically. In November 1949, 6 open-hearth furnaces were in production and another was being rebuilt, but open hearth No. 8, badly damaged during the war, had not been touched. There was no mention of the restoration of the Bessemer and Thomas converters. 19/

Improvements in Practices. In July 1949, Stalino workers pledged to attain an output of 5.28 MT of steel for each square meter of hearth area during the year. 20/ In November 1949, workers attained an average yield of 5.05 MT of steel for each square meter of hearth area, 700 kg above the planned yield for 1950. The schedule called for the completion of one melt in 9 hours, but high-speed workers reportedly were completing melts in 7 to 8 hours. 21/ Also in November 1949 it was announced that (1) a suspension roof had been installed in No. 4 furnace, which had increased the number of melts between repairs by 150; (2) relining of furnaces with dolomite was being done mechanically rather than by hand; (3) a new method of cooling parts of open-hearth furnaces was being used which resulted in the replacement of caissons only once during every 2 or 3 furnace campaigns when cold repairs were made; and (4) arched anterior walls were replaced with nonarched walls, which increased the furnace's durability. 22/ In March 1950 it was announced that the steel coefficient had been fixed at 5.21 MT. 23/ Between 1 and 12 March 1950, workers performed 88 fast melts and produced many additional tons of steel. On 31 March, N. Bychkov completed a melt in 7 hours and 55 minutes, as compared to the normal time of 9 hours and 45 minutes and attained 8.58 MT of steel per square meter of hearth area as compared to the usual 5.82 MT. A few days later an all-time record was set at Stalino by L. Matveev, who reduced melting time to 6 hours and 40 minutes and realized 9.7 MT of steel for each square meter of hearth area. 24/ In May 1950 it was announced that workers at the Stalino Laboratory had done considerable work in increasing the weight of ingots. Engineers changed the form of the molds and increased the weight of the ingots by 300 kg, thereby decreasing considerably the metal wasted in rolling operations. The work also helped to decrease the consumption of expensive molds. Previously 45 molds were used for 1,000 MT of steel, but only 35 molds were needed under the new system. 25/ In November 1951, K.V. Baranov, Director of Stalino Iron and Steel Works; P.G. Glazkov, Chief of the Open-hearth Shop; and three others were awarded a Stalin Prize, First Class, for devising and mastering a new method of cooling open-hearth furnaces. 26/

25X1B4d

[redacted]

At Present. Eight open-hearth furnaces are in operation at Stalino. Information on hearth areas at the present time is not available. It is estimated, however, that sizes are approximately the same as they were before World War II. Bessemer and Thomas converters were not rebuilt.

Estimated 1952 Open-Hearth Steel Production at Stalino*

Hearth Area (Sq M)	Coefficient	Operating Days	Production (Thousand MT)
45.6	5.2	325	77.0
45.6	5.2	325	77.0
45.6	5.2	325	77.0
42.4	5.2	325	71.6
35.7	5.2	325	60.3
35.7	5.2	325	60.3
35.7	5.2	325	60.3
35.7	5.2	325	60.3
Total Open-Hearth Steel Production			543.8

Estimated 1953 Open-Hearth Steel Production at Stalino*

Hearth Area (Sq M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
45.6	5.5	325	81.5
45.6	5.5	325	81.5
45.6	5.5	325	81.5
42.4	5.5	325	76.3
35.7	5.5	325	63.8
35.7	5.5	325	63.8
35.7	5.5	325	63.8
35.7	5.5	325	63.8
Total Open-Hearth Steel Production			576.0

* See Appendix C, Methodology, for use of coefficient in increasing production.

g. Primary Rolling Facilities.

Prewar. In 1941 primary rolling facilities at Stalino consisted of one blooming mill and billet mill, 1-stand, 900-mm. 29/

Reconstruction Period. It is not believed that the blooming mill suffered irreparable damage during World War II. It was in operation in 1944. A report stated in 1947 that the blooming mill was obsolescent and required an overhauling every 2 weeks, which required 2 days' work. In December 1949 it was announced that new techniques had been introduced into the primary mill. Both soaking pits in the section were converted from solid fuel to gas for heating, which improved the heating of the ingots and increased the productivity of the department. It was claimed that the soaking pits were no longer a bottleneck for the blooming mill. The brickwork of the pits had been burning out frequently and needed repair. Engineer Kodryanskiy proposed that the chamotte bricks be replaced in the arch and the walls, and when this work had been finished, repairs were rarely necessary. 30/

At Present. It is believed that the blooming mill now in operation at Stalino is basically the same as that in production before World War II.

h. Finishing Rolling Facilities.

Prewar. Before World War II the following finishing rolling mills were in operation at Stalino:

One heavy bar mill, 2-high, reversible, 710-mm
Three medium bar mills, 3-high
One small bar mill, 3-high
Sheet steel also was produced. 31/

Reconstruction Period. Two bar mills were in operation at the plant in 1944. Toward the end of 1947, two mill trains were dismantled at the Demag Plant in Berlin, Germany, and were delivered to the Stalino Plant. These mill trains were to be used for the rolling of armor plate. Considerable difficulty was experienced in setting up the mills, and by the end of 1949 they were still not in operation. 32/ In November 1949, Stalino was awarded the Red Challenge Banner for the improvement of the quality of its rolling mill products. The plant had mastered the production of Pobeda Steel (see Steelmaking Facilities above), introduced a new method of tube calibration and several devices for shifting metal which reduced the scratching of surfaces, and saved 1,100 MT of steel. 33/

At Present. There is no descriptive information available on the types of finishing mills in operation at the present time in Stalino. Items reported as being produced at the mill include rods for reinforced concrete, steel profiles for the automotive industry and others, and corrugated steel sheet. 34/

i. Intraplant Services.

Power Plant. Prior to World War II, the power plant at Stalino had a 25,000-kw turbogenerator. The electric power equipment received heavy damage during the war, and it was estimated to have been 80 percent destroyed. In November 1949 the power plant was reported to be in operation with an unknown number of turbines, one of which was of German origin and had a capacity of 9,000 kw. There were three transformer stations in the plant area. At that time Stalino was reported to be receiving additional power from Zaporozh'ye. 35/

Mechanical Shop. In November 1949 the mechanical repair shop of the mill was equipped with 6 lathes, 1 electric hammer, 1 steam hammer, 1 milling machine, and 1 drill press. 36/

Boiler Shop. In November 1949 the boiler shop contained four coal-fired boilers which produced steam for use in the open-hearth plant. 37/

Gas-Generating Plant. The gas-generating plant in November 1947 was equipped with six producers from which coal gas was obtained for heating the annealing ovens in the rolling mill. 38/

Pump House. In November 1949, water was pumped from a reservoir located in the center of the city of Stalino. The supply was inadequate, and there was always a shortage of water in the steel mill. 39/

Refractory Plant. Refractory bricks were manufactured prior to the war, and it is believed that the plant is still in operation. 40/

j. Products and Production.

Prewar. In the years before World War II the following were produced at Stalino:

Metallurgical Coke	Sheets
Pig Iron	Rails
Steel	Spring Steel
Special Steels	Boiler Plate 41/

At Present. The following are being produced at the present time:

Metallurgical Coke	Rails
Pig Iron	Sheets
Steel	Plate
Special Steels	Rods for reinforced concrete
	Corrugated Sheet. 42/

Production.

Production at Stalino

Year	Pig Iron		Steel		Rolled Products	
1934	690.5	43/	384.8	43/	339.0	43/
1935	708.5	43/	419.0	43/	370.3	43/
1936			494.0	44/		
1937			526.5	44/		
1938			530.7	44/		
1940	883.0	44/	588.7	44/	568.0	44/
			281.8	47/		
1944	265.0	45/	130.0	45/		
1950			540.0	48/		
1951	1,000.0 (Capacity)	46/	1,095.0 (Capacity)	46/	600.0 (Capacity)	46/
1952	877.3	49/	544.0	49/	391.6	49/
1953	907.6	49/	576.0	49/	414.7	49/

k. Distribution.

In March 1949 one source claimed that ingots were shipped to the rolling mill at Mariupol' (now called Azovstal) or Il'ich at Zhdanov for processing. 50/ In September 1950 it was announced that operators of rolling mill No. 4 had begun work on an order for the Kuybyshev power station. 51/ In October 1950 it was announced that a rolling mill had fulfilled an order for the Stalingrad hydroelectric power station. 52/

l. Plant Efficiency.

The following information throws some light on the efficiency of operation of the Stalino Iron and Steel Plant:

There was an item in the Soviet press in 1947 which stated that the efficiency of labor at Stalino had to be raised. In 1940 the plant produced 131 MT of pig iron and 107 MT of steel per worker per month, but in 1947 only 100 MT of pig iron and 102 MT of steel were produced.* 53/ One source reported that the biggest bottleneck in the operation of the mill was the water supply. Shortages became so acute in mid-summer that all unnecessary water consumption had to be cut off. Transportation difficulties during the winter months caused serious shortages of iron ore. It was also reported that open-hearth furnaces operated poorly or were tapped prematurely -- frequently, when a furnace was tapped, pieces of scrap which had not melted were left in the furnaces. 54/

m. Administration.

In 1952 the plant was under the direction of the Ministry of Ferrous Metallurgy. 55/

n. Personnel.

Number of Employees. Reports vary as to the number of people employed at the Stalino Iron and Steel Works. In 1941 there were 14,000 workers. Estimates for the postwar years

* No attempt should be made to estimate steel production on the basis of this information.

vary from 10,000 to 20,000. It is estimated that 15,000 employees are at the plant, working 3 shifts per day, 7 days a week. 56/

Administrative Personnel. From an unknown date until 18 July 1947 the Director of Stalino was Pavel Vasil'yevich Andreyev, who died suddenly at the plant. 57/

From July 1947 to the present time the director has been Vasil'yevich Baranov. Baranov is between 50 and 55 years old, spent 12 years in the US, married a Swedish national, speaks English, French, and German fluently, and was the senior member of a Soviet delegation which visited US steel plants in 1946. Formerly he was the chief of the Stalino Rolling Mills. He is not believed to be a confirmed Communist. 58/

The chief of the Stalino open-hearth furnace department in November was Petr Gerasimovich Glazkov. 59/

o. Locational Characteristics.

The plant area is surrounded by a fence 2 m high, and special passes are required for admission. 60/

D. Kramatorsk Complex. 25X1A2g

11. Khartsyzsk Pipe Plant. [redacted]

a. Location.

40° 02'N - 38° 09'E, Khartsyzsk, Stalin Oblast, Ukraine SSR. 1/

b. History and Development.

The plant was in existence in 1934. The installation suffered no damage during World War II.

c. Raw Materials and Other Inputs.

In the prewar years, billets for processing were shipped in from the Makeyevka Steel Mill. The present source is not known. 2/

d. Coal and Coke.

In 1941 coal was received from the Donets Basin, which is believed to be the source of the present supply. 3/

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

None.

g. Primary Rolling Facilities.

Billets are shipped in to the plant for processing.

h. Finishing Rolling Facilities.

Before World War II there were several mills for the production of skelp, and five pipe-welding mills of the Dikke type. 4/

i. Intraplant Services.

No information available.

j. Products and Production.

Products. In April 1951 the plant was producing skelp, welded pipe, pipe fittings, and swivel nozzles. 5/

Production. In 1934, 13,300 MT of welded pipe were produced, and in 1940 output amounted to 20,000 MT. 6/ 1952 production is estimated at 20,000 MT. It is not believed that production was increased in 1953.

k. Distribution.

Several items have appeared in the press regarding the distribution of products: in December 1950, several hundred tons of large pipes were shipped to Stalingradstroy; in February

1951, Khartsyzsk shipped pipe to the Tsimlyanskiy Water Supply and Power Center; in April 1951 the tube works at Khartsyzsk in the Donbas shipped hundreds of tons of tubing to the Volga-Don Canal builders; in April 1952 the plant received an order for 100 MT of pipe from the Kuybyshev project; and in June 1952, Khartsyzsk had recently shipped a number of large-diameter steel water pipes to the Kakhovka Hydroelectric Construction Project. 7/

l. Plant Efficiency.

In April 1951 it was announced that the plant was filling all orders ahead of schedule. This efficiency was due partly to the constant perfecting of technological processes. In 1950 for the first time the pipe mill adopted, with the help of the Ukraine Academy of Sciences, the E.O. Paton method of twin-arc automatic welding. As a result, the reconstruction welding stands were producing twice as much pipe as was produced when the (oxyacetylene) gas-welding method was used. 8/

m. Administration.

The pipe mill is believed to be under the direction of the Ministry of Ferrous Metallurgy.

n. Personnel.

Number of Employees. In April 1948 it was estimated that there were 2,000 employees at the plant, one-third of whom were women, working 3 shifts, 6 days per week. 9/

Administrative Personnel. Director of the plant in July 1948 was (fnu) Slysk. The head of the pipe welding division in April 1951 was Engineer (fnu) Garagulya. 10/

o. Locational Characteristics.

In the spring of 1948 the plant area was surrounded by a fence, with wooden control towers in each corner. The gates were guarded by civilians, and passes with photographs were required for admission. 11/

12. Kramatorsk Metallurgical Plant imeni Kuybyshev.

[redacted] 25X1A2g

a. Location.

48° 45'N - 37° 33'E. The plant is located in the western part of Kramatorsk, in Stalino Oblast, Ukraine SSR. The site lies along the Donets railroad line, and the Torets River flows through the site from south to north. 1/

b. History and Development.

The Kramatorsk Metallurgical Plant formerly belonged to the Kramatorskaya Corporation, and in 1914 it employed 1,750 people. According to the construction plan for 1936, the plant was to have the following capacities:

Pig Iron	850,000 MT
Steel	220,000 MT
Rolled Products	270,000 MT

Some destruction was suffered by the installation during World War II, and in 1944 work on restoration of facilities was begun. 2/

c. Raw Materials and Other Inputs.

Iron ore is shipped in from mines at Krivoy Rog. In late 1948 it was reported that iron and steel scrap was received from the Stalin Heavy Machinery Plant. 3/

d. Coal and Coke.

Coal. Coal comes from the Donets Basin.

Coke. Approximately 25 percent of coke requirements are supplied by a small coke-chemical plant at Kramatorsk. Production is supplemented by shipments of metallurgical coke from other plants in the Ukraine. The coke-chemical plant at Kramatorsk consists of 1 coke battery with 50 Collin coke ovens. It was built in 1914, but did not go into operation until 1923.

The following estimate of the plant was made by an authoritative source:

Number of Batteries	1
Number of Collin Coke Ovens	50
Volume of Oven (Cu M)	9.1
Normal Coking Time (Hours)	16
Coal Charge per Oven, Dry Basis (MT)	8.5
Total Daily Carbonization Capacity (MT)	637
Total Annual Carbonization Capacity (MT)	174,420
Annual Coke Capacity, Dry Basis (MT)	132,560
Annual Coke Capacity, Moist Basis (MT)	140,000
Annual Refined Benzene Capacity (MT)	1,134
Annual Refined Toluene Capacity (MT)	266
Annual Crude Tar Capacity (MT)	5,257
Annual Ammonium Sulfate Capacity (MT)	1,861 4/

e. Ironmaking Facilities.

Prewar. Before World War II there were 2 blast furnaces, No. 2 and No. 3, in operation at Kramatorsk. No. 1 furnace, which had a working volume of 312 cu m, was torn down by the Russians in 1933 and was never rebuilt. No. 4 furnace, which was designed for a volume of 930 cu m, was under construction. Dimensions of the operating furnaces follow:

Furnace Number	Working Volume (Cu M)	Diameter (mm)			
		Hearth	Bosh	Stockline	Large Bell
2	553 or 571	4,900	6,200	4,350	3,000
3	455	4,000	5,620	4,350	3,000 5/

Reconstruction Period. No. 2 blast furnace was destroyed during the war, and No. 3 furnace was badly damaged. Reconstruction began early in 1944, and the following items, principally from the press and from radio broadcasts, record the progress achieved: in October 1944, No. 2 furnace had been repaired and was drying; in January 1945, No. 3 furnace was restored; in May 1945, No. 3 furnace produced its first pig iron;

in September 1948, Kramatorsk had two blast furnaces. No mention, however, was made that both were working; in September 1949, at the time of the departure of the last prisoners of war, all agreed that: (1) No. 2 and No. 3 furnaces were restored and that No. 4 blast furnace was still being constructed; (2) only No. 3 furnace was in operation; and (3) No. 4 furnace, which had been designed by Krupp of Essen, Germany, was completed except for the automatic charging equipment, which the Russians had been unable to construct. 6/

Improvements in Practices. In July 1946 it was announced that a turboblower with a capacity of 2,000 cu m per minute had been placed into operation by blast furnace No. 3. The furnace, it was claimed, was then capable of adding 82 MT of pig iron to its daily capacity. 7/ In July 1948 it was announced that blast furnace workers at Kramatorsk had pledged for the second half of 1948 a blast furnace coefficient of 1.05 instead of the planned coefficient of 1.14. 8/

At Present. Three blast furnaces are in operation at Kramatorsk.

Estimated 1952 Pig Iron Production at Kramatorsk*

No. Blast Furnace	Volume (Cu M)	Coefficient	Operating Days	Production (Thousand MT)
2	571	1.14	340	170.2
3	455	1.14	340	135.7
4	571	1.14	340	170.2
Total Pig Iron Production				476.1

* See Appendix C, Methodology, for use of coefficient in estimating production.

Estimated 1953 Pig Iron Production at Kramatorsk*

No. Blast Furnace	Volume (Cu M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
2	571	1.05	340	184.9
3	455	1.05	340	147.3
4	571	1.05	340	184.9
Total Pig Iron Production				517.1

f. Steelmaking Facilities.

Prewar. Five open-hearth furnaces were in operation before World War II.

No. Open Hearth	Hearth Area (Sq M)	Year Placed in Operation
1	27.38	1933
2	31.9	1933
3	32.3	1933
4	31.7	1929
5	31.7	1931 9/

Reconstruction Period. The following progress was reported on the restoration of the open-hearth furnaces at Kramatorsk: in July 1945 it was announced that another open-hearth had been commissioned; in July 1946 it was stated that open hearth No. 5 had gone into operation -- the third open hearth to be restored at the steel plant -- and that work on the reconstruction of No. 4 would follow shortly; in September 1948 it was announced that three furnaces were in operation; in October 1948 it was claimed that reconstruction of No. 4 had been completed and that it was drying; in September 1949, several prisoners of war reported that 5 furnaces were restored and that 3 were in operation while the other 2 were undergoing repairs. 10/

* See Appendix C, Methodology, for use of coefficient in estimating production.

Improvements in Practices. In July 1948, workers in the open-hearth shop at Kramatorsk pledged for the last half of 1948 a steel coefficient of 5.1 MT instead of the planned output of 4.7 MT. In July 1949 it was announced that a new method was being used to increase the resistance of refractories in the open hearths. Instead of placing the lining bricks flat, they were laid edgewise. The first 2 rows were of a thickness of 1-1/2 bricks and the following 2 rows were each of a thickness of a single row of bricks. It was claimed that the run of the furnace was thus increased from an average of 28 heats to 60 heats. In mid-1949 a prisoner of war claimed that the usual practice was to charge the furnace with 45 percent scrap. In June 1950 a new system of cooling furnaces was introduced and the charging of the furnaceswas improved, which made it possible to achieve an average production in the first week of 6.58 MT of steel for each square meter of hearth area as compared to a norm of 5.1 MT. In December 1950 the steel coefficient was claimed to be 6.0 MT. 11/

At Present. Five open-hearth furnaces, with an approximate capacity of 60 MT each, are in operation at Kramatorsk, with approximately the same dimensions that existed before World War II.

Estimated 1952 Open-Hearth Steel Production at Kramatorsk*

No. Open Hearth	Hearth Area (Sq M)	Coefficient	Operating Days	Production (Thousand MT)
1	27.38	5.1	325	45.3
2	31.9	5.1	325	52.8
3	32.3	5.1	325	53.5
4	31.7	5.1	325	52.5
5	31.7	5.1	325	52.5
Total Open Hearth Steel Production				256.6

One source claimed, however, that 5 open hearths were in operation in 1950, 3 of which had hearth areas of

* See Appendix C, Methodology, for use of coefficient in estimating production.

36 square meters and 2 of which had areas of 48 square meters. 12/ Using a coefficient of 5.1 MT, production would have been 338,000 MT on this basis.

Estimated 1953 Open-Hearth Steel Production at Kramatorsk*

No. Open Hearth	Hearth Area (Sq M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
1	27.38	5.5	325	48.9
2	31.9	5.5	325	57.0
3	32.3	5.5	325	57.7
4	31.7	5.5	325	56.6
5	31.7	5.5	325	56.6
Total Open-Hearth Steel Production				276.8

g. Primary Rolling Facilities.

Prewar. There is no information on the blooming mill in operation at Kramatorsk before World War II.

Reconstruction Period. In February 1947 it was announced that Kramatorsk was to receive a blooming mill which was being built by Ushuralzavod. 13/

At Present. A blooming mill is in operation, but no information is available on size and capacity.

h. Finishing Rolling Facilities.

Prewar. There were three bar mills in operation at Kramatorsk before World War II, as follows: 1 heavy bar mill, 3-high, 620-mm; 1 medium bar mill, 2-high, consisting of one 600-mm roughing stand and four 360-mm finishing stands; 1 small bar mill, 3-high, consisting of one 600-mm roughing stand, two 360-mm intermediate stands, and a 280-mm finishing stand. 14/

* See Appendix C, Methodology, for use of coefficient in estimating production.

Reconstruction Period. In October 1946 it was announced that Rolling Mill 620, a heavy bar mill, had been restored to its prewar capacity and was in operation. It was expected to produce 95,000 MT annually. In April 1947 it was stated that Rolling Mill 280, the small bar mill, had been restored and was in operation. It was also claimed that a new sheet mill was being constructed; that it was scheduled for operation by the end of the year; and that it would supply the automotive, metalware, and building industries. In September 1947 one source reported that another rolling mill was under construction and that the Russians claimed it was the largest mill in existence. It was reported to be 1,500 m long, and 3,500 workers were said to be engaged in installing it. In September 1948 it was announced that rolling mills 620 and 280 were in operation.

At some time during the reconstruction period a structural mill and a rod mill were installed at Kramatorsk, for all prisoners of war who were at the plant claimed that structural shapes and wire were produced at the plant. 15/

At Present. The 620 and 280 bar mills, a sheet mill, a structural mill, and a wire mill are known to be in operation at Kramatorsk.

i. Intraplant Services.

No information available.

j. Products and Production.

The Kramatorsk Metallurgical Plant produces metallurgical coke and chemical byproducts, pig iron, steel, bars, structural shapes, sheet, wire rod, and wire.

Reported Production at Kramatorsk

Thousand Metric Tons

	1930 16/	1934 17/	1935 18/	1936 18/	1950	1952 21/	1953 21/
Metallurgical Coke	80				132.5 19/	132.5	132.5
Pig Iron	300	189	287.6	355		476.1	517.1
Steel for RM's	153	148.3	186	226.8	380 20/	256.6	276.8
Steel for Forgings	5						
Rolled Products	120	195.1	213		280 20/	184.7	199.3

k. Distribution.

The following items on the distribution of products of the Kramatorsk Metallurgical Plant appeared in the Soviet press: in May 1946 the Kramatorsk Metallurgical Plant was shipping pig iron to the Druzhkovka Steel Mill; in March 1951 the mill was making fittings for the Stalingrad Power Station; in April 1951, Kramatorsk was shipping structural shapes to the Stalingrad and Kuybyshev power stations, and rolled steel to the Volga-Don construction site; in May 1951 and April 1952 the metallurgical plant was shipping rolled products of various shapes to the Volga-Don Canal project and to the Tsimlyansk site; in December 1952, Kramatorsk fulfilled an order for 340 MT of structurals for the Kakhovka Hydroelectric Power Station project. 22/

l. Plant Efficiency.

No information available.

m. Administration.

The plant is under the Ministry of Ferrous Metallurgy.

n. Personnel.

Approximately 3,500 employees were at work in the metallurgical plant in 1937. In 1949 it was estimated that the number of employees ranged from 5,000 to 6,000. Three shifts were worked each day. 23/

Administrative Personnel. In July 1946 the chief engineer of the Kramatorsk Metallurgical Plant was (fnu) Filonenko, but in July 1948, Filonenko was mentioned as the director of the plant. 24/

o. Locational Characteristics.

Prisoners of war reported that the plant area was surrounded by a brick wall 2 m high, which had no control towers. The steel mill was guarded by civilians armed with rifles. 25/

13. Novo-Kramatorsk Machinery Building Plant imeni I.V. Stalin. (NKMZ imeni Stalin). [redacted]

25X1A2g

a. Location.

48° 45'N - 37° 34'E. The plant is in the northeast section of the city of Kramatorsk, Stalino Oblast, Ukraine SSR. It lies immediately east of the Kazennyy-Torets River and east of the main railroad line, Moskva-Khar'kov-Taganrog. On the southern border of the plant site is the Kramatorsk Metallurgical Plant imeni Kuybyshev. 1/ .

b. History and Development.

The Novo-Kramatorsk Machinery Building Plant was built in 1933-35, and has become one of the largest producers of industrial machinery and equipment in the USSR. The plant was planned to produce 150,000 MT of metal products a year, and in the prewar years furnished, among other things, rolling mills to Zaporozh'ye, open-hearth furnaces to Azovstal and Magnitogorsk, large castings to the Krivoy Rog Turbogenerator Works, and mining equipment and machinery for use in the Krivoy Rog mines. With the German advance into the Ukraine during World War II, the Russians evacuated all movable equipment and machinery to the Electrostal plant in the Moscow area -- which also bears the same name, Novo-

Kramatorsk Machine Building Plant imeni Stalin. With the recapture of the Ukraine, reconstruction of the damaged plant began and new equipment, reportedly from a Dusseldorf machine plant, was moved into the Ukraine plant. In addition to machinery and equipment, the Stalin plant produced large gun barrels and aircraft bomb cases during the war years. By mid-1946 the iron and steel foundries were ready to begin operations, and two open-hearth furnaces were in production. 2/

c. Raw Materials and Other Inputs.

In November 1944 the plant was receiving ferrosilicon with a metal content of 75 percent and 45 percent from the Zestafoni Ferroalloy Plant. Pig iron, rolled products, and gas for use in the open-hearth furnaces came from the nearby Kramatorsk Metallurgical Plant. One source reported that rolled steel 20 cu m in diameter was being shipped into the plant from Zaporozh'ye in May 1949. 3/

d. Coal and Coke.

Little information is available. Coal was being received from Stalino by rail in May 1949, and it is believed that metallurgical coke is procured from the coke plant at Kramatorsk Metallurgical Plant, which lies to the south. 4/

e. Ironmaking Facilities.

None. Pig iron is received from the Kramatorsk Metallurgical Plant.

f. Steelmaking Facilities.

Prewar. In the years before World War II, Novo-Kramatorsk had 4 open-hearth furnaces, 1 VEO 3-ton electric furnace, and 2 10-ton electric furnaces. The open hearths, 2 of which had capacities of approximately 35 MT and 2 of 100 MT, had the following dimensions:

No. Open Hearth	Hearth Area (Sq M)	Year Placed in Operation
1	19.6	1934
2	19.6	1934
3	44.68	1933
4	44.68	1933 5/

Reconstruction Period. The damage sustained by steelmaking facilities at Novo-Kramatorsk is not known. In 1944 it was announced that the open-hearth shop was restored and that steel was being produced. In mid-1946 two open hearths were in operation, and in April 1948 it was announced that the fourth open hearth was restored to its prewar capacity. In May 1948 it was announced that a 10-ton electric furnace had been restored. A prisoner of war claimed that in May 1949, 4 open-hearth furnaces and 2 electric furnaces were in operation. 6/

Improvements in Practices. In May 1940 it was announced that No. 4 open hearth had melted the first rustproof steel. Formerly this type of steel was melted in the electric furnace. It was to be used for the making of blade wheels for hydroturbines. 7/

In May 1948 it was announced that a 230-MT basic steel ingot had been made, for the first time in the USSR, at the Novo-Kramatorsk Plant. The ingot was to be used for the making of a hydrogenerator shaft. No. 2 furnace was charged with 100 MT of raw materials, No. 3 was charged with 80 MT, and No. 4 was charged with 70 MT. Output amounted to 95 MT plus 75 MT plus 65 MT, or a total of 234 MT of ingot. The three heats were tapped simultaneously. 8/

At Present. Four open-hearth furnaces and 3 electric furnaces are in operation at Novo-Kramatorsk. Two open hearths have a capacity of approximately 100 MT, and 2 have 35 MT.

Estimated 1952 Open-Hearth Steel Production at Novo-Kramatorsk*

No. Open Hearth	Hearth Area (Sq M)	Coefficient	Operating Days	Production (Thousand MT)
1	19.6	5.0	325	31.8
2	19.6	5.0	325	31.8
3	44.68	5.0	325	72.6
4	44.68	5.0	325	72.6
Total Open-Hearth Steel Production				208.8

Estimated 1952 Electric Furnace Steel Production at Novo-Kramatorsk

Thousand Metric Tons

No. Furnace	Capacity	Production
1	3	3.0
2	10	20.0
Total Electric Steel Production		23.0
Estimated Total 1952 Steel Production		231.8

Estimated 1953 Open-Hearth Steel Production at Novo-Kramatorsk*

No. Open Hearth	Hearth Area (Sq M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
1	19.6	5.5	325	35.0
2	19.6	5.5	325	35.0
3	44.68	5.5	325	78.8
4	44.68	5.5	325	78.8
Total Open-Hearth Steel Production				227.6

* See Appendix C, Methodology, for use of coefficient in estimating production.

Estimated 1953 Electric Furnace Steel Production
at Novo-Kramatorsk

Thousand Metric Tons

No. Furnaces	Capacity	Production
1	3	3.0
2	10 (each)	20.0
Total Electric Steel Production		23.0
Estimated Total 1953 Steel Production		250.6

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

None.

i. Intraplant Services.

No information is available which bears directly on steelmaking facilities.

j. Products and Production.

Novo-Kramatorsk produces castings and forgings.

Production of Raw Steel
1934-53

Year	Metric Tons
1934 9/	104,000
1935 9/	160,500
1936 10/	161,000
1950 11/	190,000
1952 12/	230,000
1953 12/	250,000

k. Distribution.

Castings and forgings are supplied to all the major industrial enterprises in the USSR.

l. Plant Efficiency.

No information is available on the efficiency of the operation of the steel plant.

m. Administration.

The plant is under the administration of the Ministry of Heavy Machine Building. 13/

n. Personnel.

Number of Employees. 650 employees worked in the steel plant of Novo-Kramatorsk in May 1949. Of these, 150 were employed in the open-hearth shop. Three shifts were worked a day, 7 days a week. 14/

Administrative Personnel. In December 1946 the chief of the open hearth shop was (fnu) Kishkin. 15/

o. Locational Characteristics.

The plant is surrounded by a barbed wire-topped stone wall approximately 3 m high, with watch towers located at regular intervals. The plant is guarded by uniformed watchmen, and passes are required for admission. 16/

14. Staro-Kramatorsk Machinery Building Plant imeni Ordzhonikidze. [redacted] 25X1A2g

a. Location.

48° 45'N - 37° 33'E. Kramatorsk, Stalino Oblast, Ukraine SSR. The Staro-Kramatorsk Machinery Building Plant lies just south of the Kramatorsk Metallurgical Plant imeni Kuybyshev. Kramatorsk is on the main railroad line, Moscow-Rostov-Baku. 1/

b. History and Development.

Staro-Kramatorsk is one of the oldest industrial organizations in the southern part of the USSR. It was constructed originally in the late 1890's, and operated as a small machinery building plant until the Russian Revolution of 1917. After its management was taken over by the state, the plant was developed and expanded. It suffered considerable damage during World War II, and reconstruction began shortly after the USSR regained the territory from the Germans in early 1944. The plant produces machinery and equipment for all types of industrial enterprises. 2/

c. Raw Materials and Other Inputs.

Pig iron arrives by rail from an unknown source. Since the plant is located so close to the Kramatorsk Metallurgical Plant imeni Kuybyshev, it is probable that some pig iron is received from that plant. 3/

d. Coal and Coke.

No information available.

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

Before World War II, the steel foundry in Staro-Kramatorsk contained 2 small Bessemer converters, each with a capacity of 1.5 MT. One Bessemer was back in operation in August 1947, and it is assumed that both converters and the electric furnace are in operation at the present time. 4/

Estimated Annual Bessemer Steel Production
at Staro-Kramatorsk
1952, 1953

Bessemer No.	Capacity (Thousand MT)	Heats per Day	Operating Days	Production (Thousand MT)
1	1.5	25	300	11.25
2	1.5	25	300	11.25
Total Bessemer Steel Production				22.50
Estimated Electric Steel Production				1.5
Total Estimated Steel Production				24.0

All steel produced is probably used within the plant for making castings and forgings.

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

Steel castings and forgings are made.

i. Intraplant Services.

No information available.

j. Products and Production

The plant produces steel castings and forgings which are used in the manufacture of equipment for industrial plants. The amount of castings and forgings is not known.

Estimated 1952 and 1953 Steel Production
at Staro-Kramatorsk

	Metric Tons
Bessemer Steel	22,500
Electric Steel	1,500
Total Steel Production	24,000

k. Distribution.

All steel castings and forgings are used in the plant.

l. Plant Efficiency.

In July 1950 it was announced that the plant had completed the Five Year Plan for the production of steel and non-ferrous castings. 5/

m. Administration.

The plant is under the administration of the Main Administration of Metallurgical Machine Building, Ministry of Heavy Machine Building. 6/

n. Personnel.

No information available.

o. Locational Characteristics.

No information available.

E. Gorlovka Complex.

15. Kirov Machine Plant (Mining Equipment Factory).

[redacted] 25X1A2g

a. Location.

48° 10'N - 38° 04'E. The Kirov Machine Plant is located in Gorlovka, Stalino Oblast, Ukraine SSR.

b. History and Development.

No information available.

c. Raw Materials and Other Inputs.

No information available.

d. Coal and Coke.

No information available.

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

In 1936 it was announced that the plant had 4 small Bessemer converters, each with a capacity of 2 MT, and 4 VEO-type electric furnaces, each with a capacity of 0.5 MT. 1/

In the postwar years, some prisoners of war reported 1 to 4 open-hearth furnaces, others reported 4 cupola furnaces, and some claimed Bessemer and electric furnaces. It is believed that the steelmaking facilities which were in operation before World War II, that is, 4 small Bessemers and 4 small electric furnaces, are in production at the present time at Kirov Machine Works. 2/

Estimated 1952 and 1953 Steel Production at Kirov

Number of Bessemers	Capacity (MT)	Daily Capacity (25 Heats)	Operating Days	Production (Thousand MT)
4 (2-ton)	8	200 MT	300	60
Estimated Electric Steel Production, 4 0.5-ton Furnaces				2
Total Steel Production				62

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

None.

i. Intraplant Services.

No information available.

j. Products and Production.

Kirov Machine Plant is one of the largest producers of coal mining equipment in the Ukraine. Total steel production, all of which is used in steel castings, is estimated to be approximately 62,000 MT per year.

k. Distribution.

No information available.

l. Plant Efficiency.

No information available.

Approved For Release 1999/09/02 : CIA-RDP79-01093A000600010003-9

m. Administration.

The plant is administered by the Ministry of the Coal Industry. 3/

n. Personnel.

No information available.

o. Locational Characteristics.

No information available.

16. Novo Gorlovka Coke-Chemical Plant No. 3 imeni Koksakhim. [redacted] 25X1A2g

a. Location.

48° 18'N - 38° 03'E. Novo Gorlovka, Stalino Oblast, Ukraine SSR. Novo Gorlovka adjoins the city of Gorlovka, and the coke plant is on the western boundary of Novo Gorlovka. 1/

b. History and Development.

Novo Gorlovka Coke-Chemical Plant was built in 1928-31. Considerable damage to facilities occurred during World War II, but by the middle of 1950 all four batteries had been restored to prewar capacities. 2/

c. Raw Materials and Other Inputs.

No information available.

d. Coal and Coke.

Coal. Coal comes from two large mines near the plant and from the Karl Marx mine near Gorlovka. 3/

Coke. Before World War II, Novo Gorlovka Coke-Chemical Plant consisted of 4 batteries, with a total of 233 ovens. Production in 1935 amounted to approximately 900,000 MT. Reconstruction of the plant began early in 1946, and by October 1949, 3 batteries were in operation and the fourth was scheduled for production by the middle of 1950. It is believed that all four batteries are in operation at the present time. The following estimate of capacities was made in 1952:

Number and Type of Batteries	4 Koppers
Number of Coke Ovens	233
Normal Coking Time (Hours)	16
Coal Charge per Oven, Dry Basis (MT)	15
Total Daily Carbonization Capacity (MT)	5,243
Annual Carbonization Capacity (MT)	1,887,480
Annual Coke Capacity, Dry Basis (MT)	1,434,424
Annual Coke Capacity, Moist Basis (MT)	1,450,000
Refined Benzene Capacity (MT per Year)	11,745
Refined Toluene Capacity (MT per Year)	2,755
Crude Tar Capacity (MT per Year)	54,448
Ammonium Sulfate Capacity (MT per Year)	19,270 4/

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

None.

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

None.

i. Intraplant Services.

No information available.

j. Products and Production.

The plant produces metallurgical coke, refined benzene, toluene, crude tar, and ammonium sulfate. Production of metallurgical coke for 1952 is estimated at 1,450,000 MT. 5/ No increase is estimated for 1953

k. Distribution.

In 1932 it was stated that the coke plant was not related closely to any particular metallurgical plant. Production formed a reserve for plants in the Stalino area and the Donbas, principally Yenakiyevo, Stalino, and Makeyevka. 6/

l. Plant Efficiency.

The plant was awarded a second premium for its outstanding work in the May 1947 competition among enterprises of the Ministry of Ferrous Metallurgy. In July 1948 the director promised in the second half of 1948 that the plant would dress 100,000 MT more run-of-the-mine coal than was called for by the plan. 7/ The coke yield in 1952 was 76.7 percent.

m. Administration.

The plant probably operates under the direction of the Ministry of the Chemical Industry. 8/

n. Personnel.

The plant director in July 1948 was (fnu) Vorob'yev. 9/ In 1949 it was reported that the director was (fnu) Boshedalov and the chief engineer was (fnu) Nikitel. 10/

o. Locational Characteristics.

No information available.

F. Konstantinovka Complex.

25X1A2g

17. Konstantinovka Coke-Chemical Plant No. 17. [redacted]

a. Location.

48° 30'N - 37° 43'E. Konstantinovka, Stalino Oblast, Ukraine SSR.

b. History and Development.

The Konstantinovka Coke-Chemical Plant was placed in operation in 1915; it consisted of 2 batteries with a total of 40 ovens, and had a reported capacity of 90,000 MT of metallurgical coke a year. Some damage was suffered during World War II. In 1944 it was announced that the plant was being rebuilt. 1/

c. Raw Materials and Other Inputs.

No information available.

d. Coal and Coke.

Coal. Coal is received from mines in the immediate area of the plant. 2/

Coke. Except for the announcement that the coke-chemical plant was being rebuilt in 1944, there is no information of a recent date on the installation. The following estimate of capacities of the plant was made in January 1952:

Number of Batteries	1
Number of Coke Ovens	40
Annual Coke Capacity, Dry Basis (MT)	291,000
Annual Coke Capacity, Moist Basis (MT)	300,000
Refined Benzene Capacity (MT per Year)	2,430
Refined Toluene Capacity (MT per Year)	570
Crude Tar Capacity (MT per Year)	11,265
Ammonium Sulfate Capacity (MT per Year)	3,987 3/

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

None.

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

None.

i. Intraplant Services.

No information available.

j. Products and Production.

The coke-chemical plant produces metallurgical coke, benzene, toluene, crude tar, and ammonium sulfate. Production in 1952 is estimated at 300,000 MT. 4/ No increase in production is estimated for 1953.

k. Distribution.

No information available..

l. Plant Efficiency.

No information available.

m. Administration.

Konstantinovka Coke-Chemical Plant probably operates under the direction of the Ministry of the Chemical Industry. 5/

n. Personnel.

In July 1948 the plant director was (fnu) Pozhidayev. 6/

o. Locational Characteristics.

No information available.

18. Konstantinovka Metallurgical Plant imeni Frunze.

[redacted] 25X1A2g

a. Location.

48° 32'N - 37° 32'E, Konstantinovka, Stalino Oblast, Ukraine SSR. The site lies in the northwestern part of the city, adjacent to the railroad station and between the Kramatorsk-Konstantinovka-Gorlovka railroad and the Torets River. 1/

b. History and Development.

The plant was built originally in 1898-99, and at one time, probably before the Russian Revolution, it was owned and operated by Toleries, Hauts-Fourneaux, Acieries et Laminoirs de Constantinovka, S.A., headquarters of which were in Brussels. The mill suffered considerable damage during World War II, variously estimated as being between 40 and 80 percent. Reconstruction and restoration of facilities began in 1944, and it was stated that the plant would be completed by 1950. The 50th anniversary of the installation was celebrated in 1948 or 1949. 2/

c. Raw Materials and Other Inputs.

Prewar. Iron ore was shipped into the plant from the Krivoy Rog Mines. 3/

Reconstruction Period. Iron ore was received from Krivoy Rog. One source, however, claimed that in August 1949 iron ore, varying in iron content from 40 to 60 percent, was shipped into Konstantinovka in 3 grades, Nos. 21, 22, and 24, and that 40 percent of the iron ore required came from Kursk and 60 percent from the Urals.

Baled scrap in late 1948 came from Tula.

Manganese ore was received in 2 grades from the Caucasus -- the 45 percent ore was used in furnaces for the production of pig iron, and the 55 percent ore was used to produce ferromanganese.

Fuel oil is shipped in from the Baku fields and Rumania. 4/

d. Coal and Coke.

Coal. Throughout the history of the plant, coal has been shipped in by rail from the Donets Basin. 5/

Coke. The situation on the production of coke at Konstantinovka is not clear from the evidence available. It is probable that there are 2 coke plants in the immediate vicinity of the city: 1 located on the southern edge of the metallurgical plant site which is under the direction of the plant and supplies only the Frunze works, and a coke-chemical plant with Soviet Koppers or Becker ovens located elsewhere in the vicinity. 6/

e. Ironmaking Facilities.

Prewar. Two blast furnaces were in operation before the war, both of which were built in 1932, and each of which had an annual capacity of 140,000 MT of pig iron.

Blast Furnace	Working Volume (Cu M)	Diameter (MM) Hearth	Bosh	Stockline
No. 1 (Pig Iron)	365	4,000	5,760	4,100
No. 2 (Ferro-manganese)	388	4,100	5,800	4,200 7/

Reconstruction Period. World War II damage to the two blast furnaces is unknown, but reconstruction started with the Soviet reoccupation of the plant in 1944. In July 1944 it was announced that blast furnace No. 1 was restored. In July 1945 it was announced that blast furnace No. 2 had been commissioned. In May 1947 a prisoner of war reported that blast furnace No. 1 had the capacity to produce 300 MT of pig iron per day, and that blast furnace No. 2 had the capacity to produce 125 to 150 MT of ferro-manganese per day. In March 1949 several prisoners of war reported that No. 1 furnace was producing 320 to 360 MT of pig iron per day, that the furnace had been modernized in March of 1948, and that furnace No. 2 was producing 130 to 150 MT of ferromanganese per day. In August 1949, two blast furnaces were in operation and construction had been started on blast furnace No. 3. One prisoner of war stated that he had worked on No. 3 and that in August 1949, the time of his departure, the furnace was 3 m high. Another prisoner of war reported 2 furnaces in operation and 1 under construction, and that No. 2 was being fitted with automatic charging devices. Still another reported that No. 3 furnace was scheduled for operation early in 1950. 8/

Practices in Blast Furnace Operation. The following charging practices were reported for the two blast furnaces:

Charging Practices for Blast Furnace No. 1 (Pig Iron)

	Kilograms	
	Source a/ 9/	Source b/ 10/
Metallurgical Coke	5,600	4,000
Limestone	3,000	2,000
Iron Ore	4,200	4,500
Manganese	750	
Scrap	700	2,000

a. As of March 1947. 28 charges were made per shift and the furnace cast 2 times each shift. Each cast yielded approximately 70 MT of pig iron, or approximately 400 MT per day.
b. As of July 1949. The furnace cast 6 times per day and yielded approximately 300 MT.

In April 1952 it was announced that the coefficient for blast furnace No. 1 was 1.11. 11/

Charging Practices for Blast Furnace No. 2 (Ferromanganese)

	Kilograms		
	Source a/* 12/	Source b/ 13/	Source c/ 14/
Metallurgical Coke	5,600	2,000	2,000
Manganese	4,500		

* Footnotes for Tabulation follow on p. 132.

Charging Practices for Blast Furnace No. 2 (Ferromanganese) (Continued)

Kilograms

	Source a/ 12/	Source b/ 13/	Source c/ 14/
Manganese (Continued)			
Mn 45 percent			1,800
Mn 55 percent			3,200
Mn 60 to 85 percent		1,400	
Scrap	700		350
Limestone	3,600	3,600	1,350
Iron Ore	600		
Bauxite	600		

a. As of March 1947. Processed 21 charges per shift, and the furnace was cast 2 times each shift. Each cast yielded 16 MT, or a daily total of 96 MT.
b. As of July 1949. Furnace cast 3 or 4 times per day. Average daily production was 150 to 200 MT of ferromanganese.
c. As of August 1949.

At Present. These blast furnaces are believed to be in operation at Konstantinovka Metallurgical Plant. There is no information on the size of blast furnace No. 3.

Estimated 1952 Production at Konstantinovka*

No. Blast Furnace	Volume (Cu M)	Coefficient	Operating Days	Production (Thousand MT)
1 (Pig Iron)	365	1.11	340	111.8
2 (Ferro-manganese)	388	2.5	340	52.8

* See Appendix C, Methodology, for use of coefficient in estimating production.

Estimated 1952 Production at Konstantinovka
(Continued)

No. Blast Furnace	Volume (Cu M)	Coefficient	Operating Days	Production (Thousand MT)
3 (Pig Iron)	400 (Estimated)	1.11	340	123.5
Total Pig Iron Production				235.3

Estimated 1953 Production at Konstantinovka*

No. Blast Furnace	Volume (Cu M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
1 (Pig Iron)	365	1.0	340	124.1
2 (Ferro-manganese)	388	2.5	340	(52.8)
3 (Pig Iron)	400 (Estimated)	1.0	340	136.0
Total Pig Iron Production				260.1

f. Steelmaking Facilities.

Prewar. Before World War II there were 5 open-hearth furnaces in operation at Konstantinovka Metallurgical Plant which were reported to have an annual capacity of 130,000 MT.

Number of Furnaces	Hearth Area (Sq M)
1	19.2
1	21.3
1	22.0
1	22.3
1	37.3 15/

* See Appendix C, Methodology, for use of coefficient in estimating production.

Reconstruction Period. Reconstruction of the open-hearth furnaces began early in 1944, and by the end of 1950 all five furnaces had been restored. 16/

Improvements in Practices. In November 1947 it was announced that the average yield of the furnaces was 6.8 MT of steel for each square meter of hearth area. In December 1947 the steel coefficient was fixed at 4.5 MT. In July 1948 it was announced that steel workers at the plant had pledged a steel output of 5.65 MT for each square meter of hearth area for the last half of 1948, instead of the planned yield of 5.45 MT. In August 1949 a prisoner of war reported that 40 to 50 percent of the open-hearth charge consisted of iron and steel scrap. In September 1949 it was announced that the steel coefficient was fixed at 6.4 MT. 17/

At Present. Five open-hearth furnaces, 4 of which have an approximate capacity of 30 MT and 1 of 65 MT, are in operation at Konstantinovka Metallurgical Plant. Hearth areas are belived to be approximately the same as those before World War II.

Estimated 1952 Steel Production at Konstantinovka*

No. of Open Hearths	Hearth Area (Sq M)	Coefficient	Operating Days	Production (Thousand MT)
1	19.2	6.0	325	37.4
1	21.3	6.0	325	41.5
1	22.0	6.0	325	42.9
1	22.3	6.0	325	43.5
1	37.3	6.0	325	72.7
Total Steel Production				238.0

* See Appendix C, Methodology, for use of coefficient in estimating production.

Estimated 1953 Steel Production at Konstantinovka*

No. of Open Hearths	Hearth Area (Sq M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
1	19.2	6.2	325	38.7
1	21.3	6.2	325	42.9
1	22.0	6.2	325	44.3
1	22.3	6.2	325	44.9
1	37.3	6.2	325	75.1
Total Steel Production				245.9

g. Primary Rolling Facilities.

No information available.

h. Finishing Rolling Facilities.

Prewar. The following finishing facilities were in operation at the plant before World War II:

One heavy bar mill, 3-stands, 3-high, 585 mm,

One small bar mill consisting of one 2-high 500-mm roughing stand and five 3-high 305-mm finishing stands,

One thin plate and sheet mill, 2-high, 5-stands 680/700 mm. This mill was reported to have an annual capacity of 100,000 MT. 18/

Reconstruction Period. Considerable damage was suffered during World War II.

In October 1947 it was announced that the 585-mm bar mill destroyed by the Germans was completely restored, and that it had been provided with complex auxiliary equipment. 19/

In August 1949, prisoners of war claimed that there were 2 rolling mills in operation, 1 for thin plates and sheet and

* See Appendix C, Methodology, for use of coefficient in estimating production.

1 for the production of structural shapes and rails. Four annealing furnaces were claimed to be in operation. One source reported a machine for the shaping of corrugated sheet metal. 20/

At Present. The bar mill, thin plate, and sheet mill, a rail and structural shape mill, and a forge shop are in operation.

i. Intraplant Services.

Prewar. A transformer station which supplied both the city and the steel plant was in operation. It had a operating voltage of 110/35/6 kv and was a 2-phase converter. 21/

Reconstruction Period. It was claimed that electric power was generated in the plant's own power plant, which contained three steam-powered turbines. There were three transformer stations within the plant area. Two welding shops were in operation. Two boiler houses had been reconstructed. A machine shop with eight to ten lathes, two boring and turning machines, four to five vertical boring machines, and three or four milling machines was in operation. A locomotive repair shop kept plant equipment in repair. There was a brick factory in production. 22/

At Present. No information available.

j. Products and Production.

Products. Konstantinovka Metallurgical Plant produces pig iron, ferromanganese, steel, bars, thin plate and sheet, rails, and structural shapes. 23/

Production.

Production at Konstantinovka

Thousand Metric Tons

Product	1933	1936	1937	1938	1949	1950	1952	1953
Pig Iron		183.6 25/			115.6 27/ 122.4 28/		235.3 35/	260.1 35/
Ferromanganese					47.6 to 61.2 29/		52.8 35/	52.8 35/
Steel	122.4 24/	158.4 25/ 200.4 26/	204.8 26/	207.3 26/	146.2 to 162.5 30/ 175.0 31/	140.0 32/ 33/	238.0 35/	245.9 35/
Sheet Steel						100.0 34/		
Finished Steel							171.3 35/	177.0 35/

k. Distribution.

In October 1944 the plant was authorized to ship 2,000 MT of steel bars to Kirov plant, Makeyevka, and to ship 150 MT of cast iron to the Andreyev plant at Taganrog. In March 1950, Konstantinovka was rolling sheet steel for agricultural machinery production by the Snegirivka Plant. In October 1951 the plant received an order for sheet metal from the Volga-Don Canal project. 36/

l. Plant Efficiency.

The following extracts of published announcements are indicative of the efficiency of the operation of Frunze:

in January 1947 the 1946 production plan was overfulfilled; in July 1947, workers of the open-hearth shop entered into a competition with workers of the Makeyevka, Stalino, Yenakiyevko, Mariupol', and Kramatorsk plants, and the Konstantinovka Metallurgical Plant achieved the best record; in December 1947 the 1947 production plan was fulfilled on 14 December 1947; in December 1948 the 1948 production plan was fulfilled on 11 December 1948; in August 1949 the Frunze plant did not fulfill the plan for the first half of 1949. One of the basis causes for the failure was the poor organization of production and labor. In January 1952 the 1951 production plan was fulfilled ahead of schedule. 37/

m. Administration.

The plant is under the administration of the Ministry of Ferrous Metallurgy. 38/

n. Personnel.

Number of Employees. Estimates of the number of employees vary greatly, but it is believed there are between 4,500 and 6,000 employees at the plant, of which 30 to 35 percent are women. Three 8-hour shifts per day are worked, 7 days a week. 39/

Administrative Personnel. August 1949 - Director of Konstantinovka Metallurgical Plant (fnu) Lyadov. 40/ January 1952 - Chief Engineer (fnu) Il'vutchenko. 41/ August 1949 - Chief of Blast Furnace Department (fnu) Ponemarov (or Ponemarenko). 42/ August 1949 - Engineers in Blast Furnace Department (fnu) Sassing and (fnu) Kaballo. 43/ August 1949 - Chief of all Mechanical Departments (fnu) Lewin. 44/

o. Locational Characteristics.

The plant area is bordered by a 2-m concrete wall on the northeast side and by a barbed wire fence on the other sides of the plant. 45/

G. Single Plants.

25X1A2g

19. Debal'tsevo Steel Foundry. [redacted]

a. Location.

48^{o} 21'N - 38^{o} 26'E. Debal'tsevo, Stalino Oblast, Ukraine SSR. Debal'tsevo is on the Donets railroad line.

b. History and Development.

The foundry was in existence before World War II. 1/

c. Raw Materials and Other Inputs.

No information available.

d. Coal and Coke.

No information available.

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

Before World War II, the Debal'tsevo Steel Foundry had 1 small open-hearth furnace, with a hearth area of 6.3 square meters, and 1 3-ton Heroult electric furnace. Both furnaces are believed to be in operation at the present time. 2/

Estimated 1952 Open-Hearth Steel Production at Debal'tsevo*

Open Hearth	Hearth Area (Sq M)	Coefficient	Operating Days	Production (Thousand MT)
1	6.3	5.0	325	10,237
Estimated 1952 Electric Steel Production				3,000
Estimated Total 1952 Steel Production				13,237

* See Appendix C, Methodology, for use of coefficient in estimating production.

Estimated 1953 Open-Hearth Steel Production at Debal'tsevo*

Open-Hearth	Hearth Area (Sq M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
1	6.3	5.5	325	11,612
Estimated 1953 Electric Steel Production				3,000
Estimated 1953 Total Steel Production				14,612

g. Primary Rolling Facilities.

See Finishing Rolling Facilities, below.

h. Finishing Rolling Facilities.

One prisoner of war claimed that an old rolling mill was damaged to such an extent during World War II that it was being torn down in late 1948, and that a new rolling mill was planned which would have in addition a wire drawing department. 3/ No further information is available.

i. Intraplant Services.

No information available.

j. Products and Production.

The Debal'tsevo Steel Foundry produces open-hearth and electric steel and steel castings.

* See Appendix C, Methodology, for use of coefficient in estimating production.

Steel and Steel Casting Production at Debal'tsevo

Product	1934	1935	1939	1952	1953
Steel	8,800 4/	9,400 4/	10,800 5/	13,300 6/	14,600 6/
(Open Hearth)				(10,300)	(11,600)
(Electric)				(3,000)	(3,000)
Steel Castings*	4,800 6/	5,100 6/	5,900 6/	7,300 6/	8,030 6/

k. Distribution.

The open-hearth and electric furnace steel are used in the foundry. The distribution of steel castings is not known.

l. Plant Efficiency.

No information available.

m. Administration.

The plant is under the direction of the Ministry of Ferrous Metallurgy. 7/

n. Personnel.

The foundry employed 5,000 workers in 1937. 8/

o. Locational Characteristics.

No information available. 25X1A2g

20. Nikitovka Coke-Chemical Plant. [redacted]

a. Location.

48° 22'N - 38° 03'E. Nikitovka, near Gorlovka, Stalino Oblast, Ukraine SSR.

* Based on US practice of yield of 55 percent of steel.

b. History and Development.

Nikitovka Coke-Chemical Plant was placed in operation in 1916. Considerable damage was sustained during World War II, but by the end of 1947 restoration was completed and the plant was operating at prewar production levels. 1/

c. Raw Materials and Other Inputs.

No information available.

d. Coal and Coke.

Coal. Coal comes from mines scattered about the town. 2/

Coke. In 1935, equipment at the plant included 4 batteries with a total of 80 Coppee-type coke ovens, each of which had a useful volume of 10.57 cu m. Yearly production capacity was 135,000 MT of metallurgical coke. 3/ Reconstruction of the batteries damaged during World War II began early in 1946, and on 31 December 1946 it was announced that No. 2 coke battery was completed and ready for firing. In October 1947 it was reported that No. 4 battery was in operation. 4/

In January 1952, Nikitovka Coke-Chemical Plant was estimated to have the following capacities:

Number and Type of Batteries	2 Coppee
Number of Coke Ovens	80
Annual Coke Capacity, Moist Basis (MT)	150,000
Refined Benzene Capacity (MT per Year)	1,215
Refined Toluene Capacity (MY per Year)	285
Crude Tar Capacity (MT per Year)	5,633
Ammonium Sulfate Capacity (MT per Year)	1,993 5/

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

None.

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

None.

i. Intraplant Services.

No information available.

j. Products and Production.

Nikitovka produces metallurgical coke, benzene, toluene, crude tar, and ammonium sulfate.

Production for 1952 and for 1953 is estimated at 150,000 MT. 6/

k. Distribution.

One source claimed that the entire production of the plant was used at mercury refineries in the town. 7/

l. Plant Efficiency.

No information available.

m. Administration.

The plant probably operates under the administration of the Ministry of the Chemical Industry. 8/

n. Personnel.

No information available.

o. Locational Characteristics.

No information available.

25X1A2g

21. Shcherbinovka Coke-Chemical Plant No. 11. [redacted]

a. Location.

48° 22'N - 37° 52'E. Shcherbinovka, Stalino Oblast, Ukraine SSR.

b. History and Development.

The coke-chemical plant was reported to have been in operation in 1889. 1/

c. Raw Materials and Other Inputs.

No information available.

d. Coal and Coke.

Coal. No information available.

Coke. Before World War II, Shcherbinovka Coke-Chemical Plant consisted of 1 battery of 38 Koppers-type ovens, each of which had a useful volume of 9.2 cu m. In 1936 it was announced that the plant had an annual capacity of 70,000 MT. There is no recent information available on the plant other than the announcement that the plant director in 1948 had pledged to reduce operating costs by 500,000 rubles for the year. 2/

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

None.

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

None.

i. Intraplant Services.

No information available.

j. Products and Production.

Based on prewar production capacity, it is estimated that production in 1952 and 1953 was approximately 70,000 MT. 3/

k. Distribution.

No information available.

l. Plant Efficiency.

No information available.

m. Administration.

No information available.

n. Personnel.

The plant director in 1948 was (fnu) Popov. 4/

o. Locational Characteristics.

No information available.

22. Toretsk Machinery Factory imeni Voroshilov.

25X1A2g [redacted]

a. Location.

48° 37'N - 37° 33'E. The Toretsk Machinery Factory is located in Druzhkovo, Stalino Oblast, Ukraine SSR. The plant is near the Druzhkovo railroad station on the Donets railroad line. 1/

b. History and Development.

The Toretsk Machinery Factory, which manufactures all types of mining equipment, was established in 1897 by a French firm. The plant was taken over by the USSR shortly after the Russian Revolution. Considerable damage, estimated to range as high as 50 percent, was suffered during World War II. By 1947 construction was completed and the plant was in full operation. 2/

c. Raw Materials and Other Inputs.

All pig iron is shipped in from Kramatorsk and Konstantinovka. 3/

d. Coal and Coke.

Coal is received from the Donets Basin, and coke is shipped in from nearby metallurgical coke plants. 4/

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

There are two small open-hearth furnaces which are believed to be in the "old foundry." Open hearth No. 1 has a hearth area of 6.3 sq m and an approximate capacity of 5 MT, and open hearth No. 2 has a hearth area of 12.7 sq m and a capacity of 15 MT. In addition, there are 3 1.5-MT Bessemer furnaces. Three more 1.5-MT Bessemers are located in the "new foundry." The steel produced is used exclusively for the making of steel castings and forgings. 5/

Estimated 1952 Production of Open-Hearth Steel at Toretsk*

Open Hearth	Hearth Area (Sq M)	Coefficient	Operating Days	Production (MT)
1	6.3	4.5	325	9,197
1	12.7	4.5	325	18,557
Total Open-Hearth Steel Production				27,754

Estimated 1952 Bessemer Steel Production

Number Furnaces	Capacity each (MT)	Total Capacity (MT)	Heats per Day	Operating Days	Production (MT)
6	1.5	9	25	300	67,500
Total Estimated 1952 Steel Production					95,254

Estimated 1953 Production of Open-Hearth Steel at Toretsk*

Open Hearth	Hearth Area (Sq M)	Estimated Coefficient	Operating Days	Production (MT)
1	6.3	4.7	325	9,600
1	12.7	4.7	325	19,300
Total Open-Hearth Steel Production				28,900

Estimated 1953 Bessemer Steel Production at Toretsk*

Number Furnaces	Capacity each (MT)	Total Capacity (MT)	Heat per Day	Operating Days	Production (MT)
6	1.5	9	25	300	67,500
Total Estimated 1953 Steel Production					96,400 MT

* See Appendix C, Methodology, for use of coefficient in estimating production.

g. Primary Rolling Facilities.

None. A source, however, reported "several" rolling mills in operation before World War II, and 1 prisoner of war claimed that there were at least 6 roll stands in operation in September 1949 which produced bars, sheet, profiles, and mine rails. There is no confirmation of these reports. 6/

h. Finishing Rolling Facilities.

The plant has a large forge shop.

i. Intraplant Services.

No information available.

j. Products and Production.

Products. The plant produces both open-hearth and Bessemer steel, which it uses in the production of steel castings and forgings for coal mining equipment of all types. The plant is one of the largest producers of mining equipment in the Ukraine.

Production. Little information is available on the production of steel products at the factory except for the claim that 6,000 MT of steel castings were produced each year before World War II. 7/

Production in 1952 is estimated at 27,000 MT of open-hearth steel and 67,000 MT of Bessemer steel. Based on a yield of 55 percent, 1952 production of steel castings and forgings is estimated at 52,000 MT if operations are conducted at full capacity. Steel production for 1953 is estimated at 96,400 MT, and steel castings and forgings at 53,000 MT.

k. Distribution.

All steel and steel products are used by the Toretsk Machinery Factory in the manufacture of mining equipment.

l. Plant Efficiency.

In May 1947 the plant was awarded a Third Class Premium for its performance during the April Socialist Competitions by the Ministry of Ferrous Metallurgy. 8/

m. Administration.

It is possible that the steelmaking facilities of the factory are under the direction of the Ministry of Ferrous Metallurgy (see Paragraph 1 above) but the factory as a whole is under the administration of the Ministry of the Coal Industry. 9/

n. Personnel.

No information available.

o. Locational Characteristics.

The plant is surrounded by a wall approximately 2 m high, and passes are required for admission to the plant area. 10/

23. Yenakiyevo Metallurgical Plant imeni Ordzhonikidze. (Petrovsk; Rykov Metallurgical Plant; E.M.Z. /Enakievsky Metallurgicheski Zavod/; Krasnaya Zavod; E.M.Z. No. 3). [redacted] 25X1A2g

a. Location.

48° 13'N - 38° 14'E. Yenakiyevo, Stalino Oblast, Ukraine SSR. The plant lies approximately 1 km southeast of the Yenakiyevo railroad station and approximately 500 km south of the main railroad line, Stalino-Khatsepetovka. The site is bounded on the west, north, and east by residential areas, and on the south by a large artificial lake. 1/

b. History and Development.

The Yenakiyevo Metallurgical Plant was constructed originally in 1898-99, and the 50th anniversary of the plant was celebrated in late 1948. During the years 1928 to 1932 the entire installation underwent reconstruction and modernization, and from 1933 to 1937 several new, fully-mechanized departments were added to the plant.

Total capitalization was planned at 252 million rubles, of which 67,670,000 rubles had been invested by 1 January 1936. Ten million rubles more were to be invested during 1936.

By the end of the year the plant was to have a rated capacity of 1,240,000 MT of pig iron, 700,000 MT of ingot steel, and 639,000 MT of finished steel.

Considerable destruction of installations and facilities took place when the Red Army withdrew from the Ukraine in the early days of World War II. Under the German occupation some rebuilding took place and some production was realized. Further destruction took place with the withdrawal of the German Army. Estimates of total war damage at Yenakiyevo vary between 20 and 40 percent. Soviet rebuilding of the steel mill began early in 1945, and by September 1947 the main installations had resumed operation. It is believed that the plant not only has been restored completely but also that some additional facilities have been added. 2/

c. Raw Materials and Other Inputs.

Prewar. Before World War II iron ore was shipped into the plant by rail from Krivoy Rog. 3/

Reconstruction Period. During the years 1943-45, raw materials were received as follows: gasoline from Krasnodar Naphtha Supply, machine oil from Makhachkala Naphtha Supply, fuel oil from Groznyy Naphtha Supply, turbine oil and machine oil from Baku Petrol Supply, vegetable oil from the Beloretakaya Oil Mill, scrap metal from the Scrap Metal Collection Points at Groznyy, Baku, and Tbilisi, and ferrosilicon from Zestafoni. 4/

At Present. Iron ore is received from Krivoy Rog. The ore is shipped to a siding in the plant area by a single-track railroad, standard gage, is unloaded into bunkers, and is transferred to the blast furnaces by belt conveyers. One source claimed the ore was hematite, with a metal content of 50 to 55 percent. It was estimated that ore is received at the rate of 15 carloads (60 MT each) per day. 5/ Manganese arrives at the rate of 1 or 2 60-ton cars each day from an unknown source. 6/ Refractories for the open-hearth furnaces come from outside the plant, and it was estimated that a year's supply is kept on hand. 7/

d. Coal and Coke.

Coal. There is an adequate supply of good quality coal both for heating and for the production of metallurgical coke in the immediate vicinity of Yenakiyevo. Coal is received daily from the Young Communist, Krasniy Oktyabr, Revolutsya, and Karl Marx mines. 8/

Coke. There are two coke-chemical plants located in the immediate vicinity of the Yenakiyevo Steel Plant: Staro-Yenakiyevo, which also bears the designation No. 6 Coke-Chemical Plant, is under the direction of the Ministry of the Chemical Industry; and Novo-Yenakiyevo, No. 23 Coke-Chemical Plant, which is under the direction of the Ministry of Heavy Industry. The two plants are adjacent to each other, separated only by a brick wall. Yenakiyevo Metallurgical Plant, in the prewar years, received 60 percent of its coke requirements from Novo-Yenakiyevo and the balance from Staro-Yenakiyevo. There is evidence that some metallurgical coke is also received from Stalino. 9/

Staro-Yenakiyevo before World War II was reported to have had 260 Evans-Kopper coke ovens, which were built in 1910-13 and which had a volume of 2,340 cu m. Little is known of the damage suffered by the plant during the war years or in the period following cessation of hostilities. On 2 July 1948 it was announced that workers at Staro-Yenakiyevo, under the direction of (fnu) Liman, pledged to dress 30,000 MT more of run-of-the-mine coal and to raise the yield in such dressing by 0.5 percent. The workers also promised to raise the output of coke 92 percent and to reduce the planned costs for 1948 by 600,000 rubles. 10/

Novo-Yenakiyevo Coke-Chemical Plant before World War II consisted of 4 batteries of 180 coke ovens with a volume of 3,564 cu m and an estimated capacity of 830,000 MT of coke per year. The first battery went into operation on 8 October 1934, and in 1935 the plant produced 675,000 MT of coke. It was announced that the third coke battery, with a capacity of 900 MT per day, went into production on 23 April 1947. It is evident that the old battery had been rebuilt and modernized, for it was stated that the battery was fully mechanized and that the linings had been changed from chamotte refractories to Dinas brick. It was also stated that 75 percent of the prewar capacity was restored with the firing of the fourth coke battery during the first half of 1948. In July

1948, workers under the guidance of plant director (fnu) Titarenko pledged to increase production 94.5 percent during the last half of the year and to reduce production costs for the year by 2.4 million rubles. 11/

An authoritative source made the following estimate in 1952 of the coke-chemical plants at Yenakiyevo.

Description	Novo-Yenakiyevo	Staro-Yenakiyevo
Number and Type of Batteries	4 Becker	N.A. Kopper
Number of Ovens	180	160
Volume of Oven (Cu M)	19.8	N.A.
Width of Oven (MM)	406	N.A.
Normal Coking Time (Hours)	16	N.A.
Coal Charge per Oven, Dry Basis (MT)	15.1	8.5
Total Daily Carbonization Capacity (MT)	4,077	N.A.
Annual Carbonization Capacity (MT)	1,467,720	N.A.
Annual Coke Capacity, Dry Basis (MT)	1,115,239	N.A.

The following capacities apply both to the Novo- and Staro-Yenakiyevo coke plants combined:

Annual Coke Capacity, Moist Basis (MT)	1,300,000
Refined Benzene Capacity (MT per Year)	10,530
Refined Toluene Capacity (MT per Year)	2,470
Crude Tar Capacity (MT per Year)	48,851
Ammonium Sulfate Capacity (MT per Year)	17,277 12/

e. Ironmaking Facilities.

Prewar. Before World War II Yenakiyevo Metallurgical Plant had a total of six blast furnaces in operation described as follows:

Number of Blast Furnace	Useful Volume (Cu M)
1	444 to 456.5
2	383 to 404
3	791
4	457
5	756
6	204 13/

Reconstruction Period. When the USSR recaptured the Ukraine after the German occupation, all blast furnaces at Yenakiyevo had suffered some damage. No. 4 was completely out of use, for the Germans had allowed the last charge to solidify in the furnace; no attempt was made by the Russians to clear it. In 1948-49 the furnace was dismantled. Reconstruction of the other five blast furnaces began at once. In December 1943 the first blast furnace was placed in operation. Blast furnace No. 1 was placed in operation on 29 January 1944. Blast furnace No. 3 was scheduled for completion during the second half of 1945 and was probably fired on 18 October 1945. Blast furnace No. 6 went into production in September 1945. In December 1946 it was announced that one more blast furnace should have been placed in production before the end of the year; however, work on the furnace had been delayed, resulting in a lack of pig iron needed by the Bessemer converters.

In August 1949, according to a prisoner of war who had spent all his time in the blast furnace department of the plant, the status of the furnaces was as follows: No. 1 was in process of being dismantled and a larger, more modern furnace was to replace it at a later date. No. 2 was in operation. It was approximately 20 m high and 5 m in diameter. No. 3 was in operation. Dimensions were approximately the same as those of blast furnace No. 2. No. 4 was dismantled during 1948-49, and reconstruction was not planned. No. 5 was a newly constructed furnace with automatic charging devices. It was approximately 20 to 25 m high and was 6 to 7 m in diameter. No. 6 furnace was in production. It was approximately 20 m high and 5 m in diameter. 14/

Sintering Plant. A sintering plant for the roasting of fine ores shipped into the plant from Krivoy Rog was placed in operation in 1940. Its capacity was approximately 300,000 MT of iron ore per year. In late October 1949 the plant was reported to be in operation. 15/

Charging Practices. A German prison of war, who had worked in the skip houses of the blast furnaces during his services at Yenakiyevo, reported burdening practices as follows:

First Blast Furnace	MT
Enriched Iron Ore	3
Iron Ore	3
"Black Ore" (probably Manganese)	3
Limestone	2.4
Scrap	1.5
Coke	4.5

This furnace was reported to have a capacity of 650 MT of pig iron per day.

Second Blast Furnace	MT
Enriched Iron Ore	9
Iron Ore	1
"Black Ore" (probably Manganese)	0.3
Limestone	2.2
Scrap	0.5
Coke	6

This furnace was reported to have a capacity of 500 to 550 MT of pig iron per day.

Third Blast Furnace	MT
Enriched Iron Ore	9
Iron Ore	2.5
"Black Ore" (probably Manganese)	0.3
Limestone	4
Scrap	1.5
Coke	8.5

This furnace was reported to have a capacity of 600 to 650 MT of pig iron per day.

Fourth Blast Furnace	MT
Enriched Iron Ore	2.4
"Black Ore" (probably Manganese)	0.9
Limestone	2.4
Scrap	0.5
Crushed Cast Rejects	1.5
Coke	4.0

This furnace was reported to have a capacity of 400 to 450 MT of pig iron per day. 16/

Improvements in Practices. The following items from Soviet newspapers throw some light on the developments in the blast furnace department at Yenakiyevo:

In July 1948 it was announced that the state plan anticipated 1 MT of pig iron for each 1.08 cu m of useful capacity for blast furnaces in 1947. 17/ In January 1950 it was claimed that blast furnaces at Yenakiyevo were averaging 1 MT of pig iron for each 0.97 cu m of furnace capacity. 18/ In April 1950, blast furnace No. 1 achieved a coefficient of 0.83 as compared to the Plan of 1.0. 19/ In June 1950, blast furnace No. 1 reached an average coefficient of 0.85 as compared to the norm of 0.97, and blast furnace No. 4 reached 0.60 as compared to the norm of 0.83. 20/ In May 1951, blast furnace No. 1 reached a coefficient of 0.77 as compared to the planned coefficient of 0.94.

At Present. Five blast furnaces are in operation at Yenakiyevo. Blast furnace No. 1, which was dismantled and rebuilt, is estimated to have a volume of 750 cu m. A foundry for casting molds for open hearths and Bessemers was in operation in September 1949. 21/

Estimated 1952 Production of Pig Iron at Yenakiyevo*

Thousand Metric Tons

Blast Furnace Number	Volume (Cu M)	Coefficient	Operating Days	Production
1	750	0.94	340	271.6
2	404	0.94	340	146.1
3	791	0.94	340	286.1
5	756	0.94	340	274.9
6	204	0.94	340	73.8
Total Pig Iron Production				1,052.5

Estimated 1953 Production of Pig Iron at Yenakiyevo*

Blast Furnace Number	Volume (Cu M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
1	750	0.90	340	283.3
2	404	0.90	340	152.6
3	791	0.90	340	298.8
5	756	0.90	340	285.6
6	204	0.90	340	77.0
Total Pig Iron Production				1,097.3

* See Appendix C, Methodology, for use of coefficient in estimating production.

f. Steelmaking Facilities.

Prewar. There were 5 open-hearth furnaces, all of which were in production in 1930, and 3 Bessemer converters in operation at Yenakiyevo in the years before World War II.

Open-Hearth Furnace Number	Hearth Area (Sq M)
1	27.19
2	35.13
3	35.35
4	42.12
5	47.6

Two of the Bessemer converters had a capacity of 10 MT each, and the third, which was used for duplexing, had a capacity of 11 MT. 22/

Reconstruction Period. It was announced that open hearth No. 3 was tapped for the first time early in April 1946. Capacity had been increased from 70 to 130 MT, and the furnace was completely mechanized and automatically controlled. The first heat, which took 8 hours to process, consisted of 70 MT of rail steel. Prisoner of war observations on the number of open-hearth furnaces and Bessemer converters in operation in September 1949 -- the date of departure for most of the Germans -- varied. It is believed that 3 open hearths were in production and another was under reconstruction, and that the 3 Bessemers were in operation. Another open hearth was planned, but construction had not yet begun. 23/

Improvements in Practices. In July 1948 it was announced that a steel coefficient of 4.4 MT was to be achieved in the second half of 1948, as compared to a fixed standard of 3.5 MT. 24/ In late November 1948 the steel coefficient was announced as 4.46 MT for the month of October. 25/

Charging Practices. One source claimed that in 1947 the charge for open-hearth furnaces consisted of the following ratio:

Pig Iron	13.0 MT
Scrap	798.3 MT
Limestone	14.9 to 15.8 Kg
Ferrosilicon	99.7 Kg
Metallurgical Coke	204.1 Kg 26/

At Present. Five open-hearth furnaces and 3 Bessemer converts, at least 1 of which is used for duplexing, are in operation at Yenakiyevo.

Estimated 1952 Open-Hearth Steel Production at Yenakiyevo*

Open-Hearth Number	Hearth Area (Sq M)	Coefficient	Operating Days	Production (Thousand MT)
1	27.19	4.5	325	39.7
2	35.13	4.5	325	51.4
3	48.4	4.5	325	70.8
4	42.12	4.5	325	61.6
5	47.6	4.5	325	69.6
Total Open-Hearth Steel Production				293.1

Estimated 1953 Open-Hearth Steel Production at Yenakiyevo*

Open-Hearth Number	Hearth Area (Sq M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
1	27.19	4.7	325	41.5
2	35.13	4.7	325	53.6
3	48.4	4.7	325	73.9
4	42.12	4.7	325	64.4
5	47.6	4.7	325	72.7
Total Open-Hearth Steel Production				306.1

* See Appendix C, Methodology, for use of coefficient in estimating production.

Estimated 1952 and 1953 Bessemer Steel Production at Yenakiyevo

Number of Furnaces	Capacity (MT)	Number of Heats per Day	Operating Days	Production (Thousand MT)
1	10	*	*	*
1	10	25	300	75.0
1	11	25	300	82.5
Total Bessemer Steel Production				157.5

An authoritative source, however, estimated that in 1950 there were in production at the plant 5 open-hearth furnaces which had a total hearth area of 214 sq m, and 3 Bessemers, each with a capacity of 24 MT. Output was estimated at 320,000 MT of open-hearth steel and 670,000 MT of Bessemer steel, or a total of 990,000 MT of steel in 1950. 27/ These estimates are considered too high.

g. Primary Rolling Facilities.

Prewar. Before World War II, Yenakiyevo had one 1,100 -mm blooming mill. 28/

Reconstruction Period. No information is available.

At Present. From what is known of the finishing mills in operation at Yenakiyevo, it must be assumed that the 1,100-mm blooming mill is in operation.

h. Finishing Rolling Facilities.

Prewar. The following finishing facilities were in operation at Yenakiyevo before World War II:

One 3-stand, 3-high, 500-mm heavy bar mill.

* Used for duplexing - no production considered.

One 3-high medium bar mill, which consisted of 1 540-mm roughing stand, 1 550-mm roughing stand, and 4 360-mm finishing stands. The mill went into operation in 1904.

One 3-high, small bar mill, which consisted of 2 400-mm intermediate stands and 7 280-mm finishing stands.

One 3-stand, 800-mm structural mill.

One 3-high universal light plate mill, which consisted of 1 780-mm horizontal stand and 1 650-mm vertical stand.

One 3-high 700/500/700 light plate mill.

One 2-high, 2-stand, 675-mm sheet mill.

The amount of war damage sustained by the finishing mills is not known. 29/

Reconstruction Period. In July 1945 it was announced that two sheet mills, for the rolling of fine and medium sheet, would be completed before the end of the year. 30/

By September 1949 the following finishing facilities were in operation:

One 800- or 850-mm structural mill which produced rails, channels, and T and I beams. Equipment included 4 reheating furnaces, 2 circular saws, 2 drills, and 1 grinding machine.

One light rail and structural mill which produced streetcar rails, mine rails, angles, Z's, T's, channels, and light I beams. Equipment included a reheating furnace, 1 circular saw, 1 gantry crane, 2 drills, and 2 grinding machines.

One medium plate mill which was placed in operation in early 1946 and which had a new conveyer system added to it in 1949.

One thin sheet mill which was placed in operation in 1946.

One wire mill, the equipment of which included 2 annealing ovens, 2 gantry cranes, and 2 wire-cutting machines.

One universal light plate mill was reported by one source to be under construction but not yet in operation in September 1949.

One tin plate mill was reported to be in operation in late 1949, but the existence of this mill has not been verified. 31/

At Present. The following finishing mills are believed to be in operation at the present time:

One 800- or 850-mm rail and structural mill.

One rail and structural mill for the rolling of light rails.

One medium plate mill.

One thin sheet mill.

One wire mill.

A universal light plate mill and a heavy plate mill for the rolling of armor plate may be in operation.

i. Intraplant Services.

Electric Power. Electric power is received by overhead high-tension line from the Dnepropetrovsk Hydroelectric Power Plant. A transformer station, approximately 500 m northwest of the blast furnaces, steps the voltage down to 380 and 220 v. Power is transmitted within the plant area by underground cables. One source claimed there were frequent interruptions in electric power during 1949. 32/

Water Supply. A pumping station which is located on the shores of the artificial lake south of the plant area supplies all water for the mill. 33/

Communications. The plant area is well serviced by branch lines of the main railroad, Stalino-Chazepetrovka. There are 3 sidings into the plant: 1 on the extreme north which serves the raw material storage area; another on the eastern side, just north of the coke batteries, which serves the coal storage bunkers; and a third which is on the southern edge of the plant site near the rolling mills. Good roads lead into Ordzhonikidze. 34/

Other Installations. In addition to the above, the following installations were in operation: a machine shop, a compressor station, a slag plant, and a refractory plant. 35/

j. Products and Production.

Products. The following are produced at Yenakiyevo: metallurgical coke and byproducts, pig iron, open-hearth steel, Bessemer steel, rails, bars and rods, heavy and light plate, structural shapes, sheet, and wire. 36/

Production. Production has been reported or estimated as follows:

Production at Yenakiyevo

Thousand Metric Tons

	1929	1934	1935	1936	1941	1947 (Capacity)	1950	1952	1953
Metallurgical Coke								1,300.0 43/	1,300.0 43/
Pig Iron	377.0 37/	725.4 38/	725.6 38/	901.2 39/		160.0 41/		1,052.0 44/	1,087.3 44/
Open-Hearth Steel		544.0 38/	544.3 38/	644.4 39/		120.0 41/	320.0 42/	293.0 44/	306.1 44/
Bessemer Steel					200.0 40/	260.0 41/	670.0 42/	157.5 44/	157.5 44/
Finished Steel		491.3 38/	491.3 38/	580.8 39/		297.0 41/		378.0 44/	383.0 44/

k. Distribution.

In 1943 and 1944, iron and steel products were being shipped to the following: (1) pig iron to the Dzaudzhikau Iron Industry, to Plant No. 221 for Armaments at Stalingrad, to the Krasnyy Sulin Steel Works, to the Military Reconstruction Administration at Rostov, to the Khar'kov Depot of the Main Administration for Metals, to Zangezur Copper Combine, and to the Andreyev Plant in Taganrog; (2) sheet steel to Andreyev Tube Works in Taganrog; (3) rails to Kolomna Plant of the Heavy Machinery Industry; (4) channels to the Minsk Metal Depot and to Glavvoyenpromstroi; and (5) metallurgical coke to the Dzaudzhikau Chamotte Works. 45/ In 1947 armor plate, according to one source, was shipped to the Dynamo Works, 2 km west of Moscow, for use in the construction of T-34 and Stalin tanks. 46/ In September 1949, rails were shipped to the Black Sea area, Leningrad and Kaluga. 47/ In September 1950, Yenakiyevo produced 250 MT of rails for the Stalingrad Hydroelectric Power Station. 48/ In November 1950, ten carloads of iron and steel products were shipped daily to the Volga-Don project. 49/ In January 1951 the plant was working on an order for the Volga-Don project. 50/ In January 1951 work was begun on the production of rails for use in the Kakhovka GES. 51/

l. Plant Efficiency.

Production in the early part of 1947, it was announced, was far below planned output. 52/ In May 1950 it was announced that the plant had received complaints of defective products. The L'vov Subsection of the Moscow-Kiev Railroad System charged that rails broke and that they were rolled from brittle metal. The Chief Engineer at Yenakiyevo refused to admit any claim against his plant, and the claim for 3,852 rubles for the faulty rails was not paid. 53/ In March 1951, Nikolay Goncharenko and six other engineers and technicians at Yenakiyevo were awarded the Stalin Prize, 1st Class, for devising and applying a new technique for the production of steel rails. 54/

m. Administration.

In 1941 the Yenakiyevo plant was under the direction of the Peoples' Commissariat for Ferrous Metallurgy (NKChM). At the present time the steel plant and Novo-Yenakiyevo Coke-Chemical Plant are under the direction of the Ministry of Ferrous Metallurgy, and

Metallurgical Coke Plant No. 6, Staro-Yenakiyevo, is under the administration of the Ministry of the Chemical Industry. 55/

n. Personnel.

Number of Workers. Peak employment in the years before the war was 17,000 workers. It is believed that at the present time approximately 20,000 workers are employed at the plant, of which approximately 2,000 workers are political prisoners. It had been estimated that 40 percent of the present force are women. The plant operates on 3 shifts per day, 7 days per week. 56/

Administrative Personnel. The Director of the Yenakiyevo Metallurgical Plant is Nikolay Ivanovich Goncharenko, who was first mentioned in this capacity in July 1948. He apparently replaced (fnu) Gubkin, who was reported as director in June 1946. 57/

Manager of the Novo-Yenakiyevo Metallurgical Coke Plant No. 23 in December 1949 was (fnu) Titarenko. 58/

Manager of the Staro-Yenakiyevo Metallurgical Coke Plant No. 6 in July 1948 was (fnu) Liman. 59/

Foreman of Blast Furnace No. 4 in May 1950 was reported to be Vardysh Koberidze. 60/

One source reported that in September 1949 there were 20 to 30 French and Swiss engineers employed in the plant on a 5-year contract, which was to expire in 1951. There is no confirmation of this report. 61/

o. Locational Characteristics.

The plant is surrounded by a fence approximately 2 m high. Special passes are required for admittance to the works. 62/

II. Voroshilovgrad Oblast.

Voroshilovgrad Oblast contains a number of small plants. Its principal contribution to the economy of the Ukraine is its output of metallurgical coke.

Estimated 1953 Production of Voroshilovgrad Oblast

	Metallurgical Coke	Pig Iron	Steel	Finished Steel
Total Production (Thousand Metric Tons)	2,800.0	1,242.1	153.3	203.4
National Share (Percent)	8.0	4.5	insign.	0.6
Regional Share (Percent)	15.6	8.3	1.3	2.6

Summary Tables - Voroshilovgrad Oblast

24. Production and Capacity
Almaznaya Iron Works
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	
2 BF's	279.5
Steel Production	0
Rolling Mill Capacity	0
Finished Steel Production	0
Power Plant Capacity	0

25. Production and Capacity
Bryanskiy Coke-Chemical Plant No. 14
1953

	Thousand Metric Tons
Metallurgical Coke Production	
3 Batteries - 150 Ovens	300.0
Pig Iron Production	0
Steel Production	0
Rolling Mill Capacity	0
Finished Steel Production	0
Power Plant Capacity	N.A.

26. Production and Capacity
Irmino Coke-Chemical Plant
1953

	Thousand Metric Tons
Metallurgical Coke Production	
2 Batteries - 84 Ovens	N.A.
Pig Iron Production	0
Steel Production	0
Rolling Mill Capacity	0
Finished Steel Production	0
Power Plant Capacity	N.A.

27. Production and Capacity
Kadiyevka Coke-Chemical Plant
1953

	Thousand Metric Tons
Metallurgical Coke Production	
4 Batteries - 160 Ovens	1,000.0
Pig Iron Production	0
Steel Production	0
Rolling Mill Capacity	0
Finished Steel Production	0
Power Plant Capacity	N.A.

28. Production and Capacity
October Revolution Locomotive Plant
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron	0
Steel Production	
4 OH's and 3 Electrics	115.8
Rolling Mill Capacity	
500-mm Blooming Mill	N.A.
300-mm Bar Mill	N.A.
Medium Plate and Sheet Mill	N.A.
Thin Sheet Mill	N.A.
2 Cold Rolling Mills	N.A.
Structural Mill	N.A.

28. Production and Capacity
October Revolution Locomotive Plant
1953
(Continued)

	Thousand Metric Tons
Finished Steel Production	83.4
Power Plant Capacity	N.A.

29. Production and Capacity
Olkhovsk Coke-Chemical Plant No. 12
1953

	Thousand Metric Tons
Metallurgical Coke Production	
4 Batteries - 150 Ovens	500.0
Pig Iron	0
Steel Production	0
Rolling Mill Capacity	0
Finished Steel Production	0
Power Plant Capacity	N.A.

30. Production and Capacity
Parkhomenko Heavy Machinery Building Plant
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	0
Steel Production	
1 Converter	37.5

30. Production and Capacity
Parkhomenko Heavy Machinery Building Plant
1953
(Continued)

	Thousand Metric Tons
Rolling Mill Capacity	0
Finished Steel Production	20.0
Power Plant Capacity	N.A.

31. Production and Capacity
Voroshilovgrad Pipe Rolling Mill
imeni Yakubovski
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	0
Steel Production	0
Rolling Mill Capacity	N.A.
Finished Steel Production	100.0
Power Plant Capacity	N.A.

32. Production and Capacity
Voroshilovsk Metallurgical Plant
imeni Voroshilov
1953

	Thousand Metric Tons
Metallurgical Coke Production	1,000.0
4 Batteries - 168 Ovens	
Pig Iron Production	
4 BF's	962.6

32. Production and Capacity
Voroshilovsk Metallurgical Plant
imeni Voroshilov
1953
(Continued)

	Thousand Metric Tons
Steel Production	0
Rolling Mill Capacity	0
Finished Steel Production	0
Power Plant Capacity	N.A.

Plant Studies - Voroshilovgrad Oblast

24. Almaznaya Iron Works. (Kadiyevski Steel Plant).

25X1A2g [redacted]

a. Location.

48° 31'N - 38° 34'E, Almaznaya, Voroshilovgrad Oblast, Ukraine SSR. It lies on the Donets railroad line, southwest of Kadiyevka. 1/

b. History and Development.

The plant was in operation in 1934.

c. Raw Materials and Other Inputs.

Iron ore is received from the Krivoy Rog iron mines. 2/

d. Coal and Coke.

Coal is shipped into the plant from the Donets Basin, and coke comes from the nearby Kadiyevka Coke-Chemical Plant. 3/

e. Ironmaking Facilities.

Two blast furnaces were constructed at Almaznaya Iron Works in the early 1930's. Number 2 had a working volume of 359 cu m, and blast furnace No. 3 had a working volume of 411.5 cu m. Some changes were made, and furnace dimensions in 1941 were as follows:

Blast Furnace No.	Working Volume (Cu M)	Diameter (MM) Hearth	Bosh	Stockline	Large Bell
2	393	4,750	5,600	4,250	3,100
3	454	4,500	6,000	4,300	2,800 4/

Improvements in Practices. In July 1948 it was announced that blast furnace workers had pledged a blast furnace coefficient of 1.03, instead of the planned coefficient of 1.14, for the last half of the year. 5/ In April 1951 it was announced that during the past 2 years the blast furnace coefficient had been improved to 0.76 instead of the norm 1.44 (sic). 6/ In October 1951 it was stated that a belt conveyer was installed in 1946-50 for supplying coke to the bins of the blast furnaces. It freed six workers for other duties. 7/

At Present. Two blast furnaces are in operation at the iron works.

1952 Pig Iron Production at Almaznaya*

Blast Furnace Number	Volume (Cu M)	Coefficient	Operating Days	Production (Thousand MT)
2	393	1.14	340	117.2
3	454	1.14	340	135.4
Total Pig Iron Production				252.6

1953 Pig Iron Production at Almaznaya*

Blast Furnace Number	Volume (Cu M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
2	393	1.03	340	129.7
3	454	1.03	340	149.8
Total Pig Iron Production				279.5

There is no information on cupola furnaces which no doubt are in operation at the iron works.

* See Appendix C, Methodology, for use of coefficient in estimating production.

f. Steelmaking Facilities.

None.

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

None.

i. Intraplant Services.

Electric power comes from the Kadiyevka Thermal Power Plant, and water is pumped into the plant area from the nearby branch of the Lugan' River. 8/

j. Products and Production.

Products. The products of Almaznaya Iron Works include pig iron, iron castings, and parts for motor vehicles and tractors. 9/

Production.

Pig Iron Production at Almaznaya
1934, 1935, 1952, 1953

Year	Thousand Metric Tons
1934	110.0
1935	125.0
1952	252.6
1953	279.5

k. Distribution.

It is believed that the larger proportion of pig iron production is used for iron castings by the plant and that some pig iron is shipped to steel plants in the Ukraine. There is no information on the distribution of iron castings.

l. Plant Efficiency.

No information available.

m. Administration.

The plant is under the administration of the Ministry of Ferrous Metallurgy. 10/

n. Personnel.

In the prewar years it was reported that 15,000 employees were working at Almaznaya, but it has been estimated that at present there are 1,500 employees working 3 shifts per day, 7 days a week. 11/

Administrative Personnel. In mid-1948 the Director of Almaznaya Iron Works was (fnu) Babenko 12/, and in April 1951 the Chief Engineer was (fnu) Nesterenko. 13/

o. Locational Characteristics.

No information available.

25X1A2g

25. Bryanskiy Coke-Chemical Plant No. 14. [redacted]

a. Location.

48° 31'N - 38° 40'E. Kadiyevka, Voroshilovgrad Oblast, Ukraine SSR. The plant lies southeast of Kadiyevka. 1/

b. History and Development.

The Bryanskiy Coke-Chemical Plant was in operation before World War II. 2/

c. Raw Materials and Other Inputs.

No information available.

d. Coal and Coke.

Coal. Coal is shipped to the coke plant from nearby mines. 3/

Coke. Coking facilities before World War II consisted of 2 batteries of 25 coke ovens each, and a quenching tower. Some damage took place during the war, and reconstruction of installations began shortly after the Soviet recapture of the area. In July 1947 it was announced that a large new coke battery had been completed as a replacement for battery No. 2, which was destroyed during the war. In January 1952 it was estimated that there were in operation three batteries which had the following capacities:

Number of Batteries	3
Number of Coke Ovens	150
Annual Coke Capacity, Dry Basis (MT)	291,000
Annual Coke Capacity, Moist Basis (MT)	300,000
Refined Benzene Capacity (MT per Year)	2,430
Refined Toluene Capacity (MT per Year)	570
Crude Tar Capacity (MT per Year)	11,265
Ammonium Sulfate Capacity (MT per Year)	3,987 4/

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

None.

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

None.

i. Intraplant Services.

No information available.

j. Products and Production.

Bryanskiy Coke-Chemical Plant produces metallurgical coke, benzene, toluene, crude tar, and ammonium sulfate.

Production of metallurgical coke in 1952 is estimated at 300,000 MT. 5/ No increase is estimated for 1953.

k. Distribution.

No information available.

l. Plant Efficiency.

No information available.

m. Administration.

It is believed that the plant operates under the administration of the Ministry of the Chemical Industry. 6/

n. Personnel.

No information available.

o. Locational Characteristics.

No information available.

25X1A2g

26. Irmino Coke-Chemical Plant. [redacted]

a. Location.

48° 36'N - 38° 36'E. Irmino, Voroshilovgrad Oblast, Ukraine SSR.

b. History and Development.

The Irmino Coke-Chemical Plant was in operation in 1936. There is no information since 1936 on the status of the plant. It is not believed that Irmino is in operation at the present time. 1/

c. Raw Materials and Other Inputs.

No information available.

d. Coal and Coke.

Coal. No information available.

Coke. In January 1936 the plant consisted of 2 coke batteries with a total of 84 Pirron-type ovens, each with a useful volume of 10.1 cu m, with a capacity to produce 100,000 MT of metallurgical coke annually. 2/

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

None.

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

None.

i. Intraplant Services.

No information available.

j. Products and Production.

No information available.

k. Distribution.

No information available.

l. Plant Efficiency.

No information available.

m. Administration.

No information available.

n. Personnel.

No information available.

27. Kadiyevka Coke-Chemical Plant (Sergo Coke-Chemical Plant, Il'ich Coke-Chemical Plant). [redacted] 25X1A2g

a. Location.

48° 33'N - 38° 40'E. Kadiyevka (formerly called Sergo), Voroshilovgrad Oblast, Ukraine SSR. 1/

b. History and Development.

The Kadiyevka Coke-Chemical Plant, consisting of four coke batteries and a complete chemical byproducts plant , was placed in operation in 1928. During the war years it was almost completely demolished. Two coke batteries were rebuilt in 1946, and by the end of 1949 the plant was once again in full operation. 2/

c. Raw Materials and Other Inputs.

No information available.

d. Coal and Coke.

Coal. No information available.

Coke. In July 1947 it was announced that a large new coke battery had been completed to replace No. 2 battery, which was destroyed during the war. By mid-1949 all four batteries were back in production. The following description of the facilities of Kadiyevka was prepared in 1952:

Number of Batteries	4
Number of Coke Ovens	160
Normal Coking Time (Hours)	16.0
Coal Charge per Oven, Dry Basis (MT)	15.0
Total Daily Carbonization Capacity (MT)	3,600
Annual Carbonization Capacity (MT)	1,296,000
Annual Coke Capacity, Dry Basis (MT)	984,960
Annual Coke Capacity, Moist Basis (MT)	1,000,000
Refined Benzene Capacity (MT per Year)	8,100
Refined Toluene Capacity (MT per Year)	1,900
Crude Tar Capacity (MT per Year)	37,550
Ammonium Sulfate Capacity (MT per Year)	13,290 3/

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

None.

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

None.

i. Intraplant Services.

No information available.

j. Products and Production.

The Kadiyevka Coke-Chemical Plant produces metallurgical coke, benzene, toluene, crude tar, and ammonium sulfate.

Estimated Metallurgical Coke Production at Kadiyevka

Year	Thousand MT
1928 4/	400.0
1932 4/	500.0
1940 4/	1,200.0
1943 4/	0
1947 4/	500.0
1952 5/	1,000.0
1952 5/	1,000.0

k. Distribution.

No information available.

l. Plant Efficiency.

It was announced in July 1948 that workers had pledged for the last half of 1948 to dress 40,000 MT more of run-of-the-mine coal than called for by the Plan, to raise the output of charges in dressing such coal by 1.5 percent, and to increase the output of metallurgical coke to 94 percent of the prewar production. 6/ The coke yield in 1952 was approximately 77 percent.

m. Administration.

In 1934 it was claimed that the plant belonged to the Coke-Chemical Industrial Trust "Coke," which was a part of the amalgamation "Steel," which operated under the Chief Directorate of the Metallurgical Industry (GUMP). 7/

It is believed that at present the plant is under the administration of the Ministry of the Chemical Industry. 8/

n. Personnel.

In July 1948 the Director of the Kadiyevka Coke-Chemical Plant was (fnu) Kondrakov. 9/

o. Locational Characteristics.

No information available.

28. October Revolution Locomotive Plant (Oktyabr Revolyutsiya; Voroshilovgrad Locomotive Plant; Lugansk Locomotive Plant). [redacted] 25X1A2g

a. Location.

48° 35'N - 39° 20'E. Voroshilovgrad, Voroshilovgrad Oblast, Ukraine SSR. The plant is located on an island in the Lugan' River, approximately 2 km northeast of the city. 1/

b. History and Development.

The October Revolution Locomotive Plant, which produces approximately 40 percent of the yearly output of Soviet locomotives, was constructed originally in 1893 as a branch of the Schwarzkopf Locomotive Works, Berlin, Germany. For a great number of years it was under the management of a German engineer (fnu) Hartmann. In 1903-13 the original plant was expanded and enlarged. After World War I it was taken over by the Soviet Government. With the German advance into the Ukraine in 1942, most of the equipment was removed to the Urals by the USSR, and many of the newer buildings were destroyed. The Germans used the facilities which remained for the repair of armored vehicles. Further destruction took place with the retreat of the German Army. All damage was repaired by 1949, and the plant was said to have been re-equipped with machinery and installations from the Schikau Works, Ebling, Germany. 2/

c. Raw Materials and Other Inputs.

It was claimed that iron ore is shipped into the plant from the Urals. 3/ Pig iron is shipped into the plant by rail from blast furnaces at Zaporozh'ye and from Voroshilovgrad. 4/ Steel ingots to supplement the production of the locomotive works are received by rail from unknown sources. One report stated that 1948 ingot shipments amounted to 3 60-ton cars per day. 5/

d. Coal and Coke.

Coal is shipped in by rail from the Donets Basin. One source reported that it was received at the rate of 500 MT per day, of which 300 MT were used in the power plant and 200 MT were consumed by plant production. 6/ One source claimed that coke was shipped into the plant from a coke plant approximately 10 km southwest of the city. 7/

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

Prewar. Reports vary on the number of open-hearth furnaces and electric furnaces in the steel foundry of the October Revolution Locomotive Works. Most German sources report 4 open-hearth furnaces, each with a hearth area of 15.5 sq m, and 2 or 3 5-ton electric furnaces. A Soviet source claimed that in 1935 there were 9 open hearths in the plant, which had a total hearth area of 150.59 sq m. This source claimed open hearths Nos. 6 and 7 were built in 1930, open hearth No. 8 was placed in operation in January 1931, and No. 9 was commissioned in August 1932. Each furnace had a hearth area of 15.5 sq m. 8/ There is no confirmation of this report.

It is believed that 4 open-hearth furnaces, each with a hearth area of 15.5 sq m, and 2 5-ton electric furnaces were in production at the beginning of World War II.

At Present. There is no firm information available on the number of open-hearth furnaces in operation at the plant. Four open-hearth furnaces with a capacity of approximately 20 MT are probably in production. Steel production is supplemented by shipments of ingots from other steel plants in the Ukraine. 9/ One source claimed that in December 1948 the steel foundry was operating four electric furnaces. 10/ It is estimated that there are 3 5-ton electric furnaces in production at the plant.

Estimated 1952 Open-Hearth Steel Production
at October Revolution Locomotive Plant

Open Hearths	Hearth Area (Sq M)	Coefficient	Operating Days	Production (Thousand MT)
1	15.5	4.8	325	24.18
2	15.5	4.8	325	24.18
3	15.5	4.8	325	24.18
4	15.5	4.8	325	24.18
Open-Hearth Steel Production				96.72
Estimated 1952 Electric Furnace Steel Production				15.0
Estimated Total 1952 Steel Production				111.72

Estimated 1953 Open-Hearth Steel Production
at October Revolution Locomotive Plant

Open Hearths	Hearth Area (Sq M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
1	15.5	5.0	325	25.2
2	15.5	5.0	325	25.2
3	15.5	5.0	325	25.2
4	15.5	5.0	325	25.2
Total Open-Hearth Steel Production				100.8
Estimated 1953 Electric Furnace Steel Production				15.0
Estimated Total 1953 Steel Production				115.8

g. Primary Rolling Facilities.

Prewar. Before World War II, the locomotive works had a blooming and billet mill consisting of 5 3-high, 500-mm stands. 11/

At Present. The blooming mill was back in operation by the end of December 1948. 12/

h. Finishing Rolling Facilities.

Prewar. The following finishing mills were in operation in the prewar years:

One medium bar mill, consisted of 5 3-high 300-mm stands.

One heavy plate mill, 3-high, 1000/800/100 mm.

One heavy plate mill, 3-high, 820/550/820 mm.

One light plate mill, 2-high, 720 mm.

One welded pipe mill.

One seamless pipe mill.

One wheel disk and axle-shaft mill, 3-high. 13/

At Present. The following finishing rolling mills were reported to be in operation by various prisoners of war, the reports of which varied considerably:

One medium bar mill, which consisted of 5 3-high 300-mm stands.

One medium plate and sheet mill.

One -- or two -- thin sheet mills.

Two cold-rolling mills.

One structural mill. 14/

One source who had worked in the mill for several months claimed that the welded pipe mill was in operation in December 1946. 15/

i. Intraplant Services.

No information available.

j. Products and Production.

Products. Steel ingots, special steels, castings and forgings, bars, plate, sheet, structurals, and welded pipe are produced at the locomotive works.

Production.

Production at October Revolution Locomotive Plant 16/

				Thousand Metric Tons
	1934	1936	1952	1953
Steel		216.0	111.7	115.8
Rolled Products		141.6	80.4	83.4
Welded Pipe	7.6			

k. Distribution.

Not all rolled products produced in the plant are used by the locomotive works. In 1951 there seemed to be a surplus for shipment to other plants and projects in the USSR. In June 1951 it was announced over the radio that the second trainload of parts and 2,700 MT of rolled sheet had been shipped out of the plant. 17/ Also in June 1951 a published report stated that structural steel had been shipped to the Stalingrad Hydroelectric Power Construction Project. 18/ In August 1951, over 2,000 MT of sheet steel were sent to construction sites of the Volga-Don Canal Project and to the Stalingrad Electric Power Station. 19/

l. Plant Efficiency.

No information available.

m. Administration.

The plant is under the direction of the Ministry of Transport Machinery Building. 20/

n. Personnel.

In February 1949 the chief of the rolling mills was reported to be Ivan Ivanovich. 21/

o. Locational Characteristics.

No information available.

25X1A2g

29. Olkhovsk Coke-Chemical Plant No. 12. [redacted]

a. Location.

48° 23'N - 39° 12'E. Uspenka, Voroshilovgrad Oblast, Ukraine SSR. Uspenka is approximately 20 km south of Voroshilovgrad.

b. History and Development.

The Olkhovsk Coke-Chemical Plant was in operation before World War II; one source reported that it was in operation in 1915. 1/

c. Raw Materials and Other Inputs.

No information available.

d. Coal and Coke.

Coal. Coal probably is received from mines nearby. 2/

Coke. In January 1936 it was announced that the plant consisted of the following:

Four coke batteries with a total of 110 ovens of the P'yett (Piette) type, each of which had a capacity of 10.2 cu m.

Three coke batteries with a total of 78 ovens of the Coppee type, each of which had a capacity of 9.76 cu m. These batteries were not adapted to byproducts recovery.

One coke battery of 30 ovens of the Kollen type, each of which had a capacity of 8.30 cu m. This battery was not adapted to byproducts recovery. 3/

The plant was damaged during World War II. In March 1946 it was announced that No. 4 coke battery was in operation and that its production had reached prewar output. In October 1946 it was claimed that the third coke battery was repaired and in operation. In early 1947 it was announced that the reconstruction of the benzol and ammonia shops was under way, and that by the end of the second quarter of 1947 the shops would be in operation. 4/

In early 1952 the following estimate was made of the capacities of the Olkhovsk Coke-Chemical Plant:

Number and Type of Batteries	4 Coppee
Number of Coke Ovens	150
Coal Charge per Oven, Dry Basis (MT)	15
Annual Coke Capacity, Dry Basis (MT)	485,000
Annual Coke Capacity, Moist Basis (MT)	500,000
Refined Benzene Capacity (MT per Year)	4,050
Refined Toluene Capacity (MT per Year)	950
Crude Tar Capacity (MT per Year)	18,775
Ammonium Sulfate Capacity (MT per Year)	6,645 5/

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

None.

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

None.

i. Intraplant Services.

No information available.

j. Products and Production.

The coke-chemical plant produces metallurgical coke, refined benzene, refined toluene, crude tar, and ammonium sulfate. 6/

Metallurgical coke production in 1952 is estimated at 500,000 MT. 7/ No increase in production is estimated for 1953.

k. Distribution.

No information available.

l. Plant Efficiency.

On 24 October 1951 it was announced that the plant had fulfilled its 10 months production plan 7 days ahead of schedule. 8/

m. Administration.

No information available.

n. Personnel.

No information available.

o. Locational Characteristics.

No information available.

25X1A2g

30. Parkhomenko Heavy Machinery Building Plant. [redacted]

a. Location.

48° 34'N - 39° 17'E. Voroshilovgrad, Voroshilovgrad Oblast, Ukraine SSR. The plant lies approximately 100 m southeast of the Voroshilovgrad railroad station in the west-central part of the city. 1/

b. History and Development.

Parkhomenko Heavy Machinery Building Plant is the third largest mining machinery plant in the USSR, and specializes in the production of mine equipment such as conveyers, coal cutting machines, cars, washing and sorting machines, ventilators, and elevators. The plant was in existence before World War II, suffered some damage from aerial bombardment during hostilities, and was restored and enlarged in the postwar reconstruction period. 2/

c. Raw Materials and Other Inputs.

Pig iron is shipped into the plant from plants in the Ukraine.

d. Coal and Coke.

Coal comes from mines in the Donets Basin, and coke is received from metallurgical coke plants in the Ukraine. 3/

e. Ironmaking Facilities.

An iron foundry contains three cupola furnaces. Two are approximately 15 m high and 1.5 m in diameter, and the third is a smaller furnace approximately 8 m high and 1.3 m in diameter. There are three core dryers in the foundry. 4/

f. Steelmaking Facilities.

Reports of prisoner of war, who had observed steelmaking facilities, varied.

Open-Hearth Furnaces. Of 14 reports, only two prisoners of war claimed that they had seen one small Siemens-Martin open-hearth furnace. It is possible that open-hearth steel is made in small quantities. 5/

Bessemer Converter. The steel foundry contained one small Bessemer converter, reported by one observer to have a capacity of 5 MT. Based upon 25 heats per day, 300 days per year, 1952 and 1953 capacity is estimated at 37,500 MT. 6/

Electric Furnace. There is one electric furnace in the steel foundry. Most of the prisoners of war stated that it was used for making special steels, but two claimed that it was used only for the making of brass for castings. 7/

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

None.

i. Intraplant Services.

Electric power comes from the Voroshilovgrad city network, supplemented by the diesel power plant within the factory area. 8/

j. Products and Production.

Products. Production of the steel foundry includes Bessemer steel, special steels, possibly open-hearth steel, cast iron, and small steel castings and forgings.

Production.

Bessemer Steel. Although the Bessemer converter has a capacity of 37,500 MT per year, 1953 production of finished castings, on the basis of US foundry practices, is estimated at approximately 20,000 MT.

Electric Steel. No information is available upon which to base a production estimate.

Open-Hearth Steel. No information is available upon which to base a production estimate.

k. Distribution.

All steel produced is consumed in the machinery plant.

l. Plant Efficiency.

No information available.

m. Administration.

The plant was reported to be under the administration of the Main Administration of the Mining Industry. 9/

n. Personnel.

No information available.

o. Locational Characteristics.

The plant is surrounded by a wall, and identification cards are required for admission. 10/

31. Voroshilovgrad Pipe Rolling Mill imeni Yakubovski.

[redacted] 25X1A2g

a. Location.

48° 34'N - 39° 20'E, Voroshilovgrad, Voroshilovgrad Oblast, Ukraine SSR. The plant is serviced by the Donets Railroad line, from the Voroshilovgrad station. 1/

b. History and Development.

The plant was in existence before World War I, sustained some damage during World War II, but was back in operation in May 1947. 2/

c. Raw Materials and Other Inputs.

Skelp for the making of welded pipes and tubes comes from an unknown steel plant in the Ukraine by rail through Stalino. 3/

d. Coal and Coke.

In September 1943 the plant was authorized to receive 1,700 MT of anthracite from Shakhty "Thermo-anthracite" (Novoshakhtinisk) and 3,300 MT from Shakhty "Thermo-anthracite" (Krasny-Sulin). 4/

In September 1948, coal was being received by rail from an unknown source through Stalino. 5/

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

None.

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

Before World War II the following pipe welding installations were in operation at Voroshilovgrad:

No. 1 for the production of butt-welded pipe 1.5 inches in diameter.

No. 2 for the production of butt-welded pipe 0.75 inch in diameter.

No. 3 for the production of lap-welded pipe 2.5 inches in diameter. 6/

Since little damage was suffered by the plant during World War II, it is assumed that the above pipe welding installations are now operating at the mill.

i. Intraplant Services.

No information available.

j. Products and Production.

Products. Welded pipe and tubing are produced at the Voroshilovgrad Pipe Rolling Mill. In addition there is a small shop where tubular bedsteads are manufactured. 7/

Production. In 1934, 10,300 MT of gas tubes were produced, of which 6,800 MT were butt-welded and 3,500 MT were lap-welded. The 1948-49 planned targets were 60,000 MT per year. In September 1948 it was announced that production capacity was restored completely and that production was approaching the prewar output of 100,000 MT per year. 1953 production is estimated to be 90,000 to 100,000 MT. 8/

k. Distribution.

In March 1951 the plant fulfilled an order for water tubes for the Volga-Don Canal. 9/ In June 1951, 40 MT of gas tubes were sent to the Volga-Don Canal. 10/ In January 1952 an order was received for gas pipe from the Kuybyshev Hydroelectric Development. 11/ In December 1952 the plant filled an order for Stalingrad Hydroelectric Power Station Project for 57 MT of water and gas pipe. 12/ In January 1953 the pipe mill shipped 340 MT of water pipe to the building site of the Kuybyshev Hydroelectric Station and to the Southern Ukrainian Canal. 13/

l. Plant Efficiency.

In June 1948 it was announced that the plant had completed its plan for the first 6 months of 1948, and on 12 December 1952 the plan for the year was completed. 14/

m. Administration.

The plant is under the direction of the Ministry of Transport. 15/

n. Personnel.

Number of Employees. Estimates of the number of employees range between 300 and 500. Three shifts are worked 6 days per week. 16/

Administrative. In July 1948 the Director of the Voroshilovgrad Pipe Rolling Mill was (fnu) Rudkov. 17/

o. Locational Characteristics.

The plant is surrounded by a fence approximately 3 m high. There are four guard towers, none of which has been used since World War II. Identification cards are needed for admittance to the plant. 18/

32. Voroshilovsk Metallurgical Works imeni Voroshilov (Alchevski; Donyetsko-Yuryevski). [redacted] 25X1A2g

a. Location.

48° 28'N - 38° 46'E. Voroshilovsk, formerly named Alchevsk, Voroshilovgrad Oblast, Ukraine SSR. The plant is located on the northwest outskirts of the city. The site borders the railroad station and extends southwest to an area southeast of the Voroshilovgrad-Debal'tsevo main rail line, a branch of which serves the plant. 1/

b. History and Development.

The Voroshilovsk Metallurgical Works was constructed first in the 1880's. Before World War I it was the property of a French concern, and after the Russian Revolution it was taken over by the USSR. Later it was named imeni Voroshilov after Marshal Voroshilov, who had worked in the plant as a crane operator.

During the early 1930's, two of the older blast furnaces were reconstructed and replaced by modern German-type furnaces which were fully mechanized. By 1933 the combine consisted of a coke-chemical plant, 5 blast furnaces, 7 open-hearth furnaces, 2 small Bessemer converters, and 4 rolling mill trains.

According to the 1936 Plan, Voroshilovsk was to have a rated capacity as follows:

Pig Iron	1,168,000 MT
Steel	1,080,000 MT
Rolled Products	875,000 MT

With the approach of the German Army, the USSR dismantled many of the installations and machinery to deny the use of the plant to the Germans. On the German retreat from the Ukraine, demolition teams blew up many of the shops, particularly those housing the open hearths and the rolling mills.

Reconstruction of blast furnaces and the coke plant began at once, and by July 1949 the blast furnaces had reached prewar production. It is considered unlikely that plans to restore the open-hearth furnaces and rolling facilities have been realized. 2/

c. Raw Materials and Other Inputs.

Iron ore is shipped in by rail from Krivoy Rog. 3/ Manganese is delivered by rail from the Urals. 4/ Limestone in 1941 was received from pits at Shterovka, Ukraine; Zhirnov, Rostov Oblast; Belaya Kalitva, Ukraine; Golubovka, near Almaznaya, Ukraine; and Ovrag in the Ukraine. At present limestone is reported to be shipped into the plant at the rate of 300 MT a day. 5/ Petroleum products in December 1944 were shipped in by rail as follows: fuel oil from Makhachkala, and petroleum bitumen from Groznyy Petroleum Supply. 6/ In June 1948 dolomite came from the Caucasus. 7/ Iron and steel scrap was received from all parts of the Donets Basin and was stored along the railroad tracks near the coke-chemical plant. 8/

d. Coal and Coke.

Coal. In June 1948, coal from the coke-chemical plant was being received by rail from Kadiyev-ugol', Dzerzhinsk-ugol', and Pervomaysk-ugol' Trusts. The claim was made that it could have been supplied by Krasnodon-ugol', Gundorv-ugol', and Kirov-ugol' Trusts, which were much nearer. 9/

Coke.

Prewar. Before World War II, there were 4 coke batteries in operation at Voroshilovsk, with a total of 168 Otto-type coke ovens and a capacity of 3,343 cu m. 10/

Reconstruction. The restoration of the coke-chemical plant began shortly after the USSR recaptured the area. In mid-1947, coke battery No. 3 had gone into operation. 11/ In January 1949, 2 coke batteries were reported to be in production, each with 40 ovens and electric pushers. One quenching tower had been rebuilt, and the benzol tar distillation and sulfate plants were in operation. 12/

In September 1949 the coke plant consisted of the following:

Battery No. 1. Reconstruction was started in May 1948, but it had not been completed.

Battery No. 2, which had not been damaged during the war and was in operation.

Battery No. 3, which was placed in operation in mid-1947.

Battery No. 4, which was destroyed during the war. The site was cleared and reconstruction started in January 1949.

Two coke-pushing rams and 1 quenching tower serviced the 3 batteries which were in operation. 13/

A 1952 estimate of the coke-chemical plant at Voroshilovsk follows:

Number and Type of Batteries	4 Otto
Number of Ovens	168
Volume of Ovens (Cu M)	19.97
Width of Ovens (MM)	400
Normal Coking Time (Hours)	15.7
Coal Charge per Oven, Dry Basis (MT)	15
Total Daily Carbonization Capacity (MT)	3,852
Annual Carbonization Capacity (MT)	1,386,720
Annual Coke Capacity, Dry Basis (MT)	1,953,907
Annual Coke Capacity, Moist Basis (MT)	1,100,000
Refined Benzene Capacity (MT per Year)	8,910
Refined Toluene Capacity (MT per Year)	2,090
Crude Tar Capacity (MT per Year)	41,304
Ammonium Sulfate Capacity (MT per Year)	14,619 14/

e. Ironmaking Facilities.

Prewar. In the prewar years the following blast furnaces were at Voroshilovsk:

Furnace Number	Date of Last Blow In	Working Volume (Cu M)	Diameter (mm) Hearth	Bosh	Stockline	Large Bell
1	1938	930	7,000	7,850	5,640	3,960
2	1939	1,050	7,400	8,140	5,900	4,200
3		366	*	*	*	*
4	1934	259	3,800	5,000	4,100	3,100
5	1940	525	5,000	6,000	5,200	3,850 15/

Reconstruction. Little damage was sustained by blast furnace No. 4 during World War II, and production began again in August 1944. By May 1947, No. 1 was in production, followed by the blowing-in of No. 2 furnace in the spring of 1949. In May 1949 it was announced that four blast furnaces were in production and that No. 5 furnace was almost complete. No. 5 furnace reportedly was used exclusively for the production of ferromanganese. Each furnace had three stoves. In January 1949 it was reported that only 50 MT of pig iron a day were used in the Voroshilov plant foundries. The major part of the production was shipped out in the form of pigs. 16/

Improvements in Practices. In July 1948 it was announced that blast furnace workers at Voroshilovsk had pledged a blast furnace coefficient of 0.97 for the second half of 1948 instead of the planned coefficient of 1.03. 17/ In November 1949 it was announced that the planned coefficient for blast furnaces was 0.70 for that month. 18/

At Present. Five blast furnaces are in operation at the present time in the Voroshilovsk Metallurgical Works, one of which, blast furnace No. 5, is producing ferromanganese. There is also a casting shop which contains 2 pig casting machines, consisting of molds mounted on an endless chain, and 8 drilling machines. 19/

* Not in operation.

1952 Pig Iron Production at Voroshilovsk*

Blast Furnace Number	Volume (Cu M)	Coefficient	Operating Days	Production (Thousand MT)
1	930	0.97	340	325.9
2	1,050	0.97	340	368.0
3	366	0.97	340	128.2
4	259	0.97	340	80.4
Total Pig Iron Production				902.5
5	525 Producing Ferromanganese			71.4

1953 Pig Iron Production at Voroshilovsk*

Blast Furnace Number	Volume (Cu M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
1	930	0.92	340	343.7
2	1,050	0.92	340	388.0
3	366	0.92	340	135.2
4	259	0.92	340	95.7
Total Pig Iron Production				962.6
5	525 Producing Ferromanganese			75.0

f. Steelmaking Facilities.

Prewar. There were 7 open-hearth furnaces and 2 1.5-ton Bessemer converters in operation before World War II. One open hearth had a hearth area of 40 sq m, 1 had 34.3 sq m, and 5 had 22.4 sq m. each. All furnaces were demolished during the war years. 20/

* See Appendix C, Methodology, for use of coefficient in estimating production.

At Present. To date there has been no indication that the steelmaking facilities at Voroshilovsk have been reconstructed. In 1947, however, it was reported that a new modern open-hearth shop would be built to replace the obsolescent works which existed before the war. 21/

In February 1949 there was a foundry with 4 drying ovens, 3 overhead-trolley cranes, and 2 molding sand mixers. 22/

g. Primary Rolling Facilities.

Prewar. In 1941, primary rolling facilities consisted of one 600-mm blooming mill. 23/

Reconstruction Period. A large part of the rolling mill equipment was removed by the Russians upon the threat of German occupation. When the Germans retreated, the remaining rolling mill equipment and the buildings were almost completely destroyed. No reconstruction was attempted until January 1949, when the site was cleared and a new building was started. In July 1949, several sources reported that the building was complete but that no machinery or equipment had been installed. In 1950, 922 MT of a blooming mill installation and 232 MT of a 750-mm rolling mill were shipped as reparations from the Krupp Works in Magdeburg, Germany. 24/

At Present. It is not believed that there are any primary or finishing rolling mills in operation at Voroshilovsk. No effort will be made to complete rolling facilities until such time as the steelmaking facilities are approaching completion.

h. Finishing Rolling Facilities.

Prewar. In 1941, finishing facilities consisted of the following:

One small 3-high bar mill, consisting of 1 500-mm roughing stand, 2 400-mm intermediate stands, and 7 finishing stands.

Two small 3-high bar mills, consisting of 2 400-mm roughing stands and 8 250-mm finishing stands.

One heavy 2-high 800-mm bar mill, consisting of 4 stands.

On One medium 3-high bar mill, consisting of 4 460-mm stands. 25/

Reconstruction Period. See Primary Rolling Facilities.

At Present. See Primary Rolling Facilities.

Old Forge Shop. In February 1949 this forge shop contained 4 gas ovens, 1 large steam hammer, 1 medium steam hammer, 4 forges, and 8 drilling machines.

New Forge Shop. In February 1949 a new forge shop was completed. It holds 10 gas ovens, 1 large steam hammer, and 2 medium steam hammers. 26/

i. Intraplant Services.

Power. Opinions differ on the source of electric power at Voroshilovsk. Several sources claim that all electric current is delivered by high-tension cable from a nearby power plant, either Zaporozh'ye or Stalino. Voltage is stepped down in the plant's transformer station to 500 v, 380 v, and 220 v. It was claimed in September 1949 that no emergency generators were available in the plant, and that once or twice a week when power was cut off, all production stopped. 27/ Other sources claim that Voroshilovsk is operated on electricity generated by the plant's own power station, equipped with generators with a capacity of 48,000 kw. The power plant supplies electricity not only to the steel plant and coke-chemical works, but also to the city of Voroshilovsk. 28/ The only firm evidence available is the January 1946 announcement that a second turbogenerator of 24,000 kw had been assembled and placed in operation. 29/ It is probable that power is generated in the plant and -- lacking the planned open-hearth shop and rolling mills -- there is a power surplus, which is used in the city. It is also believed that the plant is connected with the Dnepr-Donets power network.

Water. There is adequate water available locally. 30/ Water for cooling the blast furnaces comes from a pond 250-m long and 80 m wide, which is within the plant area and on the edge of which is a pumping station. 31/

Boilerhouse. The boiler house contains 4 or 5 boilers, which are heated by blast furnace gas. 32/

Pattern-Making Shop. This shop contains 2 lathes, 2 planing machines, 1 drilling machine, and 1 milling machine. 33/

Electric Motor Repair Shops. The motor repair shop contains 1 lathe, 1 shaping machine, 1 drilling machine, and 1 electric welding set. 34/

Sheetmetal Shop. Installed in this shop are one large shear and a punch machine. 35/

Compressor Station. This building contains 3 or 4 large gas or electrically driven compressors which supply air for the blast furnace stoves through overhead pipes. 36/

j. Products and Production.

Products. Before World War II, production included metallurgical coke and its byproducts, pig iron, ferromanganese, ingot steel, bars and billets, plates, rails, structural shapes, and forgings such as shafts, axles, gear wheels, pipe couplings, gun barrels, and bushings. Ordnance items were shipped to Rostov for finishing. 37/ At present Voroshilovsk is producing metallurgical coke and its byproducts, pig iron, ferromanganese, castings, and forgings. 38/

Production. Production reports by various sources follows:

Production at Voroshilovsk

Thousand Metric Tons

	1932	1934	1935	1936	1947	1952	1953
Metallurgical Coke	500 39/				400 39/	1,100 43/	1,100 43/
Pig Iron		598.6 40/	744.7 40/	758.4 41/		902.5 42/	962.6 42/
Steel		180 40/	216.1 40/			0	0
Rolled Products		193.9 40/	236.8 40/			0	0

k. Distribution.

In November and December 1944, 40 MT of forgings and cast iron were shipped to Glavvoyen-Promstroi and 130 MT of cast iron to the Krasny-Sulin Steel Works. 44/ Up to January 1949 the major portion of foundry products was sent to the Voroshilovgrad Locomotive and Tank Factory. 45/ In September 1949 the bulk of pig iron was shipped to Frunze Metallurgical Plant in Konstantinovka, and to plants at Taganrog and Rostov. 46/ In August 1952 it was announced that the plant had shipped 100 MT of iron during the first half of 1952 to Zaporozh'ye Metallurgical Constructional Enterprise, which produced equipment for the Kakhovka Hydroelectric Power Station. 47/ In December 1952, Voroshilovsk completed its orders for cast iron for the Kuybyshev Hydroelectric Power Project. 48/

l. Plant Efficiency.

No information available.

m. Administration.

Voroshilovsk Metallurgical Works is under the direction of the Ministry of Ferrous Metallurgy. 49/

n. Personnel.

Number of Employees. In the prewar years there were 8,000 to 10,000 employees at the plant. In mid-1949, estimates of the number of employees ranged between 10,000 and 20,000, 25 percent of which were women and 10 percent apprentices. Three shifts were worked each day, 7 days a week. 50/

Administrative Personnel. In September 1949 the following held administrative positions in the plant:

Director of Voroshilovsk Metallurgical Works (fnu) Gmyria.

Manager of the Blast Furnace Department (fnu) Avanazi.

Manager of the Coke-Chemical Plant (fnu) Ivchenko. 51/

o. Locational Characteristics.

The plant is surrounded by a 2-m high slag-concrete wall, topped by barbed wire. Watch towers, with sentries on duty 24 hours a day, are spaced around the wall. Plant police, armed with carbines, are stationed at all gates. 52/

III. Dnepropetrovsk Oblast.

Dnepropetrovsk Oblast is the second most important iron and steel production center in Economic Region III.

Estimated 1953 Production of Dnepropetrovsk Oblast

	Metallurgical Coke	Pig Iron	Steel	Finished Steel
Total Production (Thousand Metric Tons)	3,220.0	4,850.3	4,041.3	2,948.6
National Share (Percent)	10.1	18.6	11.1	11.2
Regional Share (Percent)	19.7	34.1	37.0	39.0

There are three steel-producing complexes in Dnepropetrovsk Oblast at Dnepropetrovsk, Dneprodzerzhinsk, and Konstantinovka.

The Dnepropetrovsk Complex contains the important steel plant, Petrovski Metallurgical Plant, and two noteworthy producers of pipes and tubes, the Dnepropetrovsk Pipe Rolling Mill imeni Lenin, and the Nizhnedneprovsk Metallurgical Plant and Tube Mill imeni Karl Liebknecht.

The important Dneprodzerzhinsk Metallurgical Plant imeni Dzerzhinski is in the Dneprodzerzhinsk Complex. Although no metallurgical coke is made at Dzerzhinski, the Dneprodzerzhinsk Coke-Chemical Plant No. 24 imeni Ordzhonikidze is one of the largest producers within Region III and supplies the needs of the Dzerzhinski Plant.

Summary Tables - Dnepropetrovsk Oblast

A. Dnepropetrovsk Complex.

33. Production and Capacity
Dnepropetrovsk Coke-Chemical Plant No. 20
imeni Kalinin
1953

	Thousand Metric Tons
Metallurgical Coke Production	
4 Batteries - 154 Ovens	940.0
Pig Iron Production	0
Steel Production	0
Rolling Mill Capacity	0
Finished Steel Production	0
Power Plant Capacity	N.A.

34. Production and Capacity
Dnepropetrovsk Metallurgical Equipment Plant DZMO
imeni Khatayevich
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	0

34. Production and Capacity
Dnepropetrovsk Metallurgical Equipment Plant DZMO
imeni Khatayevich
1953
(Continued)

	Thousand Metric Tons
Steel Production	
2 OH's and 2 Electrics	55.8
Rolling Mill Capacity	0
Finished Steel Production	30.6
Power Plant Capacity	0

35. Production and Capacity
Dnepropetrovsk Pipe Rolling Mill
imeni Lenin
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	0
Steel Production	325.6
6 OH's	
Rolling Mill Capacity	
675/550/675-mm Plate Mill	50.0 to 60.0
Universal Mill	45.0 to 55.0
Lap Welding Shop	30.0 to 40.0
Butt-Welding Shop	30.0 to 40.0
Mannesmann Seamless Tube Shop	44.0 to 52.0
Thin-Walled Tube Shop	6.0 to 8.0
Finished Steel Production	224.4
Power Plant Capacity	0

36. Production and Capacity
Komintern Steel Combine
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	0
Steel Production	
2 OH's	126.5
Rolling Mill Capacity	N.A.
Finished Steel Production	92.0
Power Plant Capacity	N.A.

37. Production and Capacity
Nizhnedneprovsk Metallurgical Plant and
Tube Mill imeni Karl Liebknecht
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	0
Steel Production	
5 OH's	451.9
Rolling Mill Capacity	N.A.
Blooming Mill	N.A.
Tube Mill	N.A.
Railroad Wheel Rolling Mill	N.A.
Finished Steel Production	325.3
Power Plant Capacity	N.A.

38. Production and Capacity
Nizhnedneprovsk Wire and Nail Plant
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	0
Steel Production	0
Rolling Mill Capacity	N.A.
Finished Steel Production	145.0
Power Plant Capacity	0

39. Production and Capacity
Petrovski Metallurgical Plant
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	
5 BF's	1,087.7
Steel Production	
6 OH's and 3 Converters	655.5
Rolling Mill Capacity	
Blooming Mill	N.A.
Roughing Mill	N.A.
Rail and Structural Mill	100.0
800/650/800-mm Plate Mill	70.0
700/500/700-mm Sheet Mill	N.A.
600/800-mm Thin Sheet Mill	N.A.
500-mm Structural Mill	N.A.
250-mm Small Shape Mill	N.A.
320-mm Wire Mill	80.0
Wire Mill	N.A.

39. Production and Capacity
Petrovski Metallurgical Plant
1953
(Continued)

	Thousand Metric Tons
Finished Steel Production	472.0
Power Plant Capacity	30,000 kw

40. Production and Capacity
Spartak Metal Goods Factory
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	0
Steel Production	0
Rolling Mill Capacity	N.A.
Finished Steel Production	N.A.
Power Plant Capacity	N.A.

B. Dneprodzerzhinsk Complex.

41. Production and Capacity
Dneprodzerzhinsk Coke-Chemical Plant
imeni Kamen
1953

	Thousand Metric Tons
Metallurgical Coke Production	
2 Batteries - 94 Ovens	N.A.
Pig Iron Production	0
Steel Production	0

41. Production and Capacity
Dneprodzerzhinsk Coke-Chemical Plant
imeni Kamen
1953
(Continued)

	Thousand Metric Tons
Rolling Mill Capacity	0
Finished Steel Production	0
Power Plant Capacity	N.A.

42. Production and Capacity
Dneprodzerzhinsk Coke-Chemical Plant No. 24
imeni Ordzhonikidze
1953

	Thousand Metric Tons
Metallurgical Coke Production	
4 Batteries - 215 Ovens	1,400.0
Pig Iron Production	0
Steel Production	0
Rolling Mill Capacity	0
Finished Steel Production	0
Power Plant Capacity	N.A.

43. Production and Capacity
Dneprodzerzhinsk Metallurgical Plant
imeni Dzerzhinski
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	

43. Production and Capacity
Dneprodzerzhinsk Metallurgical Plant
imeni Dzerzhinski
1953
(Continued)

	Thousand Metric Tons
8 BF's	2,574.9
Steel Production	
15 OH's and 3 Converters	1,763.0
Rolling Mill Capacity	
1,100-mm Blooming Mill	N.A.
1,150-mm Blooming Mill	N.A.
780/600-mm Universal Mill	N.A.
640-mm Bar Mill	N.A.
No. 1 550-mm Small Bar Mill	N.A.
No. 2 550-mm Small Bar Mill	N.A.
860/630/830-mm Plate Mill	N.A.
650/500/650-mm Plate Mill	N.A.
630-mm Sheet Mill	N.A.
860-mm Rail and Structural Mill	N.A.
500-mm Rod Mill	N.A.
Finished Steel Production	1,269.3
Power Plant Capacity	90,000 kw

C. Single Plants.

44. Production and Capacity
Krivoy Rog Metallurgical Plant
imeni Stalin
1953

	Thousand Metric Tons
Metallurgical Coke Production	880.0
2 Batteries - 138 Ovens	

44. Production and Capacity
Krivoy Rog Metallurgical Plant
imeni Stalin
1953
(Continued)

	Thousand Metric Tons
Pig Iron Production	
3 BF's	1,187.7
Steel Production	
2 Converters	660.0
Rolled Steel Capacity	
Blooming Mill	N.A.
Finished Steel Production	N.A.
Power Plant Capacity	N.A.

45. Production and Capacity
Nikopol Pipe and Tube Mill
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	0
Steel Production	
1 Electric	3.0
Rolling Mill Capacity	N.A.
Finished Steel Production	90.0
Power Plant Capacity	0

46. Production and Capacity
Novomoskovsk Sheet Mill
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	0
Steel Production	0
Rolling Mill Capacity	N.A.
Finished Steel Production	300.0

Plant Studies - Dnepropetrovsk Oblast

A. Dnepropetrovsk Complex.

33. Dnepropetrovsk Coke-Chemical Plant No. 20 imeni Kalinin (Tukhovski Coke-Chemical Plant). [redacted]

25X1A2g

a. Location.

48° 28'N - 34° 35'E. Dnepropetrovsk, Dnepropetrovsk Oblast, Ukraine SSR. The plant lies approximately 7 km southwest of the center of the city of Dnepropetrovsk, and south of the Dnepr River and the Petrovski Metallurgical Plant. The main east-west railroad line is just north of the plant. 1/

b. History and Development.

Plans for the construction of the Dnepropetrovsk Coke-Chemical Plant were initiated before the First Five Year Plan. Batteries Nos. 3 and 4 were built in 1927-29, and Nos. 1 and 2 were added during 1936-37, at which time the recovery of byproducts was begun. Reconstruction of the damage sustained during World War II began shortly after the USSR recaptured the Ukraine. All four coke batteries and the byproducts recovery installations were in full operation in 1950. 2/

c. Raw Materials and Other Inputs.

Before World War II, water came from the Dnepr River and furnace gas was received from blast furnaces at the nearby Petrovski and DZMO metallurgical plants. 3/

d. Coal and Coke.

Coal. Coal comes from the mines in the Donets Basin. 4/ Coal was unloaded by modern methods before World War II, and was deposited in 3 underground bunkers, each with a capacity of 800 MT. There were two coal crushing installations and a belt conveyer. 5/

Coke.

Prewar. Two Coppee coke batteries of 37 ovens each were built in 1929. These were rebuilt in 1936-37 into Becker-type ovens by Koksokhimmontazh. They were heated by blast furnace gas. Two additional Coppee batteries of 40 chambers each were built by the German firm of Demag in 1927-29. These batteries were not remodeled. They were heated by coke gas. 6/

Reconstruction Period. The following announcements of accomplishments at the plant appeared in the press: On 3 July 1945 a coke battery was ready to be commissioned. In June 1946 No. 3 coke battery, the second to be reconstructed, was placed in operation. No. 2 battery was under construction and the ammonium sulfate plant was in operation. In December 1946 a coke battery, a coal washer, the coal preparation shop, and the steam boilers were completed. On 29 April 1947 the benzol shop was placed in operation. 7/

At Present. The following estimate of the capacities of the Dnepropetrovsk Coke-Chemical Plant was made in 1952:

Number and Type of Batteries	2 Becker	2 Coppee
Number of Coke Ovens	74	80
Volume of Ovens (Cu M)	19.6	19.5
Width of Ovens (MM)	406	400
Normal Coking Time, (Hours)	16.0	15.7
Coal Charge per Oven, Dry Basis (MT)	15.0	14.0
Total Daily Carbonization Capacity (MT)	1,665	1,680
Annual Carbonization Capacity (MT)	599,400	604,800
Annual Coke Capacity, Dry Basis (MT)	455,544	459,648

Annual Coke Capacity, Moist Basis (MT)	940,000
Refined Benzene Capacity (MT per Year)	7,615
Refined Toluene Capacity (MT per Year)	1,786
Crude Tar Capacity (MT per Year)	35,297
Ammonium Sulfate Capacity (MT per Year)	12,492 8/

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

None.

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

None.

i. Intraplant Services.

No information available.

j. Products and Production.

Metallurgical coke, benzene, toluene, crude tar, and ammonium sulfate are produced at the plant. 9/

Production in 1952 and also in 1953 is estimated at 940,000 MT. 10/

k. Distribution.

Coke is shipped to Petrovski Metallurgical Plant and to other steel plants in the vicinity of Dnepropetrovsk. 11/

l. Plant Efficiency.

Coal yield from charged coal was 78 percent in 1952.

m. Administration.

The plant is probably operating under the direction of the Ministry of the Chemical Industry. 12/

n. Personnel.

In July 1946 the Chief Engineer was (fnu) Lakiza. In July 1948 the director of the plant was (fnu) Popov. In January 1953 the deputy director of the plant was Semyen Ivanovich Bogoyevsky. 13/

o. Locational Characteristics.

No information available.

34. Dnepropetrovsk Metallurgical Equipment Plant DZMO (Dnepropetrovsk Zavod Metallurgicheskogo Oborudovaniya) imeni Khatayevich. [redacted] 25X1A2g

a. Location.

48° 28'N - 34° 58'E, Dnepropetrovsk, Dnepropetrovsk Oblast, Ukraine SSR. The site lies east of the Petrovski Metallurgical Plant in the western part of the city, and approximately 500 m from the Dnepr River. 1/

b. History and Development.

Construction of the plant was begun in 1912 by the Chaudoir Tube and Rolling Mill Corporation, which erected 1 blast furnace and 2 open hearth furnaces. During the Bolshevik Revolution and for some years thereafter the plant lay idle, and was not placed in operation until 1932. For a time it was under the same administration as that of the Petrovski Metallurgical Plant. Blast furnace No. 1 was reconditioned in 1932, and the boilerhouse, a new blower house, and a steel-casting foundry were erected. In 1932 the administration of DZMO was separated from that of the Petrovski Plant. In 1935 the steel-casting foundry began operations. The tube plant and its machine shop were built in 1936. The two electric furnaces, which had been idle for several years, were put in operation in 1938, principally for the production of manganese steel. The oxygen plant was erected, and the construction and other auxiliary departments began operations in the same year. In 1941, work was begun on the five new boilers of the power plant.

As the Germans advanced into the Ukraine, a large part of the machinery and installations of the plant were removed by the Soviet government. The mill suffered considerable damage during World War II, with estimates of destruction running as high as 50 percent. Reconstruction began shortly after Soviet recapture of the Ukraine. 2/

c. Raw Materials and Other Inputs.

Prewar. 27,000 to 28,000 MT of iron ore per month, or approximately 330,000 MT per year, came by rail from Krivoy Rog for the production of pig iron. 8,000 MT per month of bauxite, or approximately 100,000 MT per year, were shipped into the plant from the Urals. This was not the high grade bauxite from Krasnaya Shapochka, but an inferior grade which was less suited for the direct extraction of alumina. Its use is not known. Limestone was shipped in by rail from Yelenovka at the rate of 10,000 to 12,000 MT per month, or approximately 125,000 MT per year. Molding sand was obtained partly from local sources. 3,000 MT were used each month in the tubing plant and 5,000 MT in the steel-casting foundry. Approximately 900 MT of fuel oil were used each month, principally in the open-hearth shop. 3/

At Present. Sources of raw materials are believed to be approximately the same as those described above. In 1947, however, some pig iron was being received from the nearby Petrovski Metallurgical Plant. 4/

d. Coal and Coke.

Prewar. Coal came from the Donets Basin and was used only to a limited extent, as fine coke was used as a fuel in the boiler house. Anthracite which was distributed to the workers for heating purposes was consumed annually at the rate of 9,000 to 10,000 MT.

Coke requirements amounted to approximately 24,000 MT per month, or 288,000 MT per year, and were met by the production of coke plants in Makeyevka, Rutchenkovo, and Zaporozh'ye. The fine coke accumulated in the transportation of metallurgical coke was sifted and used in the boilerhouse. 5/

At Present. There is no information on the sources and requirements of the plant for coal and coke, but sources are believed to be the same as those described above.

e. Ironmaking Facilities.

Prewar. There were two blast furnaces in operation, as follows:

Blast furnace No. 1 had a capacity of 480 cu m, a diameter of 5 m, and a height - to the lower edge of the bell -- of 20.5 m. It had 4 blast furnace stoves with heating surfaces of 7,500 to 8,000 sq m each.

Blast furnace No. 2 had a capacity of 217 cu m, a diameter of 3.15 m, and a height -- to the lower edge of the bell -- of 18.8 m. It had 2 blast furnace stoves with heating surfaces of 3,600 sq m each. Furnace No. 2 was used chiefly for the production of ferrosilicon. It was reported that experiments with oxygen-enriched air were being conducted with this furnace.

Furnace No. 1 was used for the production of titanium pig iron. Coke consumption was 1,150 kg per ton of foundry pig iron, 1,300 to 1,400 kg per ton of titanium pig iron, and approximately 2,000 kg per ton of ferrosilicon.

Figures on the production of the 2 blast furnaces are not available, but production capacity was estimated at approximately 170,000 MT per year in 1940. 6/

At Present. There is no information available on the restoration or the present status of the two blast furnaces.

Cast Iron Tube Plant.

Prewar. There were 4 cupola furnaces, each with a capacity of 10 MT per hour, or a combined daily production of 400 MT. Casting was done in mold boxes, which were carried on a band conveyer. The sand was dumped mechanically, and approximately 45 percent of the burned sand was put back in circulation. Much equipment was removed by the Russians, and when the Germans took over the plant all machines were incomplete and unusable. 7/

At Present. The cast iron pipe plant is in operation, but there is no information concerning equipment and the amount of production.

Old Foundry.

Prewar. The old foundry contained 2 cupola furnaces with a capacity of 5 tons per hour for each furnace, or approximately 1,500 MT per month. 8/ No other information is available.

At Present. The status is not known.

f. Steelmaking Facilities.

Prewar. There were two open hearth furnaces in operation at the plant. 35 MT of raw materials were charged, and output amounted to 32 MT. As a rule 3 charges were made every 24 hours. Hearth areas were estimated at 16.0 sq m. The open-hearth shop was demolished during World War II.

In addition to the open hearths, there was 1 3-ton and 1 6-ton electric furnace. The 3-ton furnace produced 9 tons of manganese steel every 24 hours and had a monthly output of approximately 175 MT. The 6-ton furnace produced 1.3 to 1.5 MT of carbides each day. 9/

In October 1940 it was announced that DZMO was making experiments on refined steel by means of synthetic slag. The synthetic slag was made of quartz, crushed chamotte, manganese ore, and titanium concentrate. The materials were melted in an electric furnace and poured into the casting ladle. The slag was used in the proportion of 5 percent of the amount of the unrefined steel. The refined steel was used in the production of the rail and tube rolling mills and as a construction material for bridges and ships. 10/

At Present. Two open hearth furnaces, with capacities of approximately 20 MT, are in operation at DZMO.

Estimated 1952 and 1953 Open-Hearth Steel Production at DZMO*

Open Hearth Number	Hearth Area (Sq M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
1	16.0	4.5	325	23.4
2	16.0	4.5	325	23.4
Total Open Hearth Steel Production				46.8
Estimated 1952 and 1953 Electric Steel Production				9.0
Total Estimated 1952 and 1953 Steel Production				55.8

Steel-Casting Foundry.

Prewar. Items produced in the steel-casting foundry included cast steel rolls, slag ladles, wheel rims, BF bell-distributors, cogging rolls, rolling mill stands, charging boxes for open hearth furnaces, annealing boxes, and gear wheels. Production amounted to 1,600 MT of steel castings and 4,100 MT of wheel rims each month. The rims were shipped to tire-rolling mills at Dneprodzerzhinsk and Voroshilovgrad. 11/

At Present. The steel-casting foundry is in production, but there is no information on details of equipment and production.

g. Primary Rolling Facilities.

No information available.

h. Finishing Rolling Facilities.

No information available.

* See Appendix C, Methodology, for use of coefficient in estimating production.

i. Intraplant Services.

Construction Department.

Prewar. The construction department produced blast furnace and steel mill installations. All machinery was removed before the Germans occupied the plant. 12/

At Present. The construction department is believed to be in operation, but no details are available.

Electric Power.

Prewar. No electricity was generated at the DZMO plant. Power requirements amounted to 9,500 to 10,000 kw, and the entire supply of electricity was obtained from the Dnepr-Donets network. There were 7 transformers in the plant area, all but 2 of which had been removed by the Russians before German occupation. 13/

At Present. No details are available.

Steam.

Prewar. Four steam boilers were in operation, each of which had a capacity of 10 to 12 tons of steam per hour while firing on blast furnace gas. A fifth boiler with a capacity of 20 to 22 tons of steam per hour was under construction but had not been placed in operation. Steam requirements for the blast furnace blowers were 25 to 26 MT per hour; for all other purposes, 10 MT per hour. 14/

At Present. No information available.

Compressors. There were six compressors at the plant at the time of the German occupation. 15/ Present status is not known.

Water Supply. In 1941, water was supplied by the pumping station at the Petrovski Metallurgical Plant. Requirements were approximately 1,100 cu m per hour. 16/ The present source of water probably remains the same.

Blast Furnace Gas.

Prewar. The supply of blast furnace gas amounted to approximately 130,000 to 140,000 cu m per hour. The gas was purified and distributed as follows:

	Hourly Rate (Cu M)
Blast Heaters	35,000
Boilerhouse	30,000 to 45,000
Drying Furnace, Steelcasting Foundry	3,000 to 5,000
Old Foundry	1,000 to 1,200
Cast Iron Tube Plant	500

A surplus of about 30,000 cu m per hour was used by the nearby Lenin plant and the Dnepropetrovsk Pipe Rolling Mill. 17/

At Present. No information available.

j. Products and Production.

Products.

Prewar. The following were among the products produced at DZMO before World War II: pig iron, raw steel, manganese steel, ingot steel for wheel rims, cast iron pipe, cast shapes, and metallurgical plant equipment. 18/

At Present. The following are among the products produced at DZMO: cast iron pipe, casting molds, cast shapes, and metallurgical plant equipment. 19/

The following products may be produced at DZMO: pig iron, raw steel, manganese steel, and castings for wheel rims.

Production. Production at DZMO is as follows:

Production at DZMO

Metric Tons

	1934	1935	1936	1940 (Capacity)	1952	1953
Pig Iron	142,700	155,300	146,400	170,000		
Raw Steel		15,400	42,000	60,000	55,800	55,800
Steel Castings				68,400		
Finished Cast Iron Pipe						72,000 20/

k. Distribution.

Several articles have appeared in the press which indicate the destination of the products of DZMO. In February 1947, "complicated" 4.5-m moulds for casting of pipe for the Moscow Metro hot blast valves for a blast furnace at Novo-Tulsky Metallurgical Zavod, and 100-hp reduction gears for mine hoists were being produced. 21/ In May 1947, DZMO was manufacturing 3,500 sets of fittings for an oil system for a sheet rolling mill at Zaporozh'ye. 22/ In May 1947, DZMO received an urgent order for tubular rings to be used as mine props in the shaft columns of the Nordvik Salt Mines. The first 200 MT of tubing had already been produced and shipped to the Arctic. 23/ In May 1948 the controlling assembly of the first car dumper for the Zaporozh'ye Coke Byproducts Plant was finished. 24/ In November 1948 the plant was producing tubing for use in the construction of the Moscow Metro. 25/ In November 1949 the production was started of all-welded 50-MT hot metal ladles for pig iron for Stalino Metallurgical Plant. 26/ In November 1950 a consignment of steel casting buggies was sent to a steel works in the Urals, a shipment of conveyer plates was sent to Odessa metal plants, and steel ladles of a large capacity were sent to Zaporozh'ye and Tula. 27/ In January 1951, DZMO shipped the first order of tubing to the Volga-Don Canal Project. 28/

l. Plant Efficiency.

In May 1947 the DZMO plant was awarded the Challenge of the Red Banner of the Ministry of Ferrous Metallurgy and the first class premium for its performace in Socialist Competition for April 1947. 29/

In December 1947 the plant was criticized for not meeting schedules in the production of metal tubing for the Moscow Metro. It was stated that efforts would be made to combat defective production and to devote more attention to the training of new workers. 30/

m. Administration.

The plant operates under the administration of the Ministry of Ferrous Metallurgy. 31/

n. Personnel.

Number. In 1941 when the plant was operating at full capacity, there were 6,500 employees. 32/ The present number of employees is not known.

Administrative Personnel. In October 1951 the Chief Engineer of DZMO was S. Sergieni. 33/

o. Locational Characteristics.

In April 1947 the plant was partly enclosed by a wooden fence and partly by a brick wall. Guard towers were located at 100 m intervals, and passes were required for admittance. 34/

35. Dnepropetrovsk Pipe Rolling Mill imeni Lenin [redacted]

a. Location.

48° 29'N - 34° 58'E. Dnepropetrovsk, Dnepropetrovsk Oblast, Ukraine SSR. The plant is located in the northwest section of the city, just south of the Petrovski Metallurgical Plant. It is on the Nizhnedneprovsk-Dneprodzerzhinsk railroad. 1/

b. History and Development.

A tube-welding shop was built in Dnepropetrovsk in 1889 by the Chaudoir Tube and Rolling Mill Corporation, the headquarters of which was in Moscow. The plant was expanded with the building of a plate mill in 1896 and the construction of the open-hearth shop in 1898. In 1906 additional buildings in the area were acquired for further expansion of the mill. The installation stood idle during the revolutionary years 1918-21 and was placed back into operation in 1922 under the management which also administered the Petrovski Metallurgical Plant. The heat-treatment department for thin tubes was erected in 1927, the thin tube-drawing shop was added in 1929, and in 1931 the metal container plant went into production. The administration of the pipe mill was separated from that of Petrovski in 1933, at which time it was assigned its present title.

During World War II, the plant suffered only moderate damage, estimated by one source at 15 percent, and production was resumed on a limited scale in 1947. Production was claimed to have reached near capacity toward the end of 1949. 2/

c. Raw Materials and Other Inputs.

Prewar.

Pig Iron. The Petrovski Metallurgical Plant, which adjoins the pipe mill to the north, shipped a monthly average of 5,500 MT of pig iron, or approximately 65,000 MT per year, for use in the open hearths. Pig iron was also received from Kamenskoye (now called Dneprodzerzhinsk) and Zaporozh'ye.

Scrap Iron and Steel. 8,000 MT of scrap iron and steel were used each month, only 20 percent of which was collected within the plant. The balance came from scrap-collection depots in Odessa, Minsk, and Leningrad.

Limestone. Limestone came from Yelenovka and Veliki-Anatol.

Quicklime. Quicklime came from Yarna in the Donets Basin.

Semifinished Steel. Semifinished steel for processing in the Mannesmann tube mill only -- 800 to 900 MT per month, or approximately 10,000 MT per year -- was received from the Krasny Oktyabr plant in Stalingrad. This steel was in 85-mm rounds with 0.15 to 0.20 percent carbon. Up to 2,000 MT of alloyed steel per month, or approximately 24,000 MT per year, came from Zaporozh'ye. Of this amount 1,800 MT were chromium-manganese-silicon steel and 200 MT were chromium-molybdenum and chromium-nickel construction steel, plus some rustproof and heat-resisting steels. Smaller amounts were received occasionally from the Elektrostal plant in Noginsk near Moscow. 800 MT of 0.05 to 0.50 carbon steel, 90 mm in diameter, came from Il'ich Steel plant each month. 3,000 MT of 0.05 to 0.50 carbon steel, 95 to 125 mm in diameter, were received from Petrovski. Total purchases of semifinished steel amounted to 6,500 to 7,000 MT per month, or 78,000 to 84,000 MT per year. In addition, 1,700 to 2,000 MT of steel ingots, poured in the mill, were rolled into semifinished steel at the Petrovski plant and returned for further working at the pipe mill.

Tubes for the Metal Container Plant. A total of 1,200 to 1,400 MT per month, or 14,400 to 16,800 MT per year, of tubing 219 mm in diameter and having an over-all wall thickness of 8 mm came from the following:

1,000 MT per month from Karl Liebknecht Plant.
120 MT per month from Pervoural'sk Plant in the Urals.
80 MT per month from Nikopol'.

Fuel Oil. Fuel oil requirements were as follows:

	MT per Month
Plate Mill and Reheating Furnaces	2,000
Pipe Welding Plant	700
Mannesmann Tube Plant	400
Metal Container Plant	300
Total per Month	3,400
Total per Year	40,800

Blast Furnace Gas. Consumption of blast furnace gas amounted to 37,000 to 42,000 cu m per hour, of which 12,000 cu m came from the DZMO plant in Dnepropetrovsk and 25,000 cu m from Petrovski Metallurgical Plant. Distribution of the blast furnace gas was as follows:

	Cu M per Hour
Open-Hearth Plant	8,000
Plate Mill	1,500
Tube-Welding Shop	6,000
Mannesmann Tube Plant	13,000
Pipe Drawing Shop	8,000
Metal Container Factory	1,500
Boiler House	4,000
Total	42,000

Coke Gas. Coke gas came from the Dnepropetrovsk Coke-Chemical Plant, and consumption was as follows:

	Cu M per Hour
Open-Hearth Shop	5,000
Plate Mill	400
Tube-Welding Shop	2,200
Mannesmann Tube Plant	800
Total	8,400 3/

Reconstruction Period and At Present. Raw materials and other inputs are being received as follows: pig iron from Petrovski Metallurgical Plant and from Zaporozh'ye, 4/ scrap from plant operations and from local collections, 5/ and limestone from Yelenovka and from Veliki-Anatol. 6/ Blast furnace gas is piped into the plant area from the Petrovski Metallurgical Plant and from the Dnepropetrovsk Metallurgical Equipment Plant. 7/

d. Coal and Coke.

Coal. Coal for use in the plant has always been shipped into the plant from the Donets Basin. 8/

Coke. Metallurgical coke has always been received from the Dnepropetrovsk Coke-Chemical Plant imeni Kalinin, except for a period during the reconstruction of the coke-chemical plant, when coke was shipped in from the Voroshilovgrad Coke-Chemical Plant. 9/

Coke Gas. Coke gas is piped into the area from Dnepropetrovsk Coke-Chemical Plant imeni Kalinin. 10/

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

Prewar. Several sources claim that there were six open-hearth furnaces in operation at Dnepropetrovsk Pipe Mill before World War II, as follows:

One open hearth had a hearth area of 16.96 sq m.

Two open hearths had hearth areas of 16.76 sq m.

One open hearth had a hearth area of 23.78 sq m.

Two open hearths had hearth areas of 43.78 sq m. 11/

According to an authoritative source, however, there were only four open-hearth furnaces at the plant when the Germans took over. It was claimed that 3 units had a capacity of 50 MT each and that the fourth had an 80-ton capacity. 12/

Postwar Reconstruction. Only minor damage was inflicted on open-hearth installations during World War II. The first open-hearth furnace to be fired after the war went into operation on 29 August 1944, and by mid-1950, all six furnaces were believed to be in production. 13/

Improvements in Practice. In August 1947 the Open-Hearth Division averaged 4.97 MT of steel for each square meter of hearth area as compared to 4.65 MT achieved in July 1944. In July 1948 workers pledged a coefficient of 4.8 MT for the second half of 1948 as compared to the previous level of 4.0 MT. 14/ In March

1950 a worker achieved a record yield of 8 MT for each square meter of hearth area as compared to the progressive norm of 5 MT. In April 1951 it was announced that the steel coefficient was 5.1 MT. 15/

At Present. Six furnaces are in operation, 3 of which have an approximate capacity of 35 MT and 3 of 100 MT. It was announced in 1951 that the sixth open-hearth furnace was being rebuilt and that when completed it would have a hearth area of 44 sq m and a capacity of 150 MT. 16/ This new furnace probably replaced one of the 16.76 sq m furnaces.

Estimated 1952 Steel Production at Dnepropetrovsk*

Open Hearths	Hearth Area (Sq M)	Coefficient	Operating Days	Production (Thousand MT)
1	16.96	5.1	325	28.1
1	16.76	5.1	325	27.8
1	44.0	5.1	325	72.9
1	23.78	5.1	325	39.4
1	43.78	5.1	325	72.6
1	43.78	5.1	325	72.6
Total Steel Production				313.4

Estimated 1953 Steel Production at Dnepropetrovsk*

Open Hearths	Hearth Area (Sq M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
1	16.96	5.3	325	29.2
1	16.76	5.3	325	28.9
1	44.0	5.3	325	75.8
1	23.78	5.3	325	40.9
1	43.78	5.3	325	75.4
1	43.78	5.3	325	75.4
Total Steel Production				325.6

* See Appendix C, Methodology, for use of coefficient in estimating production.

g. Primary Rolling Facilities.

It is not believed that there are any primary rolling mill facilities at Dnepropetrovsk. All steel ingots are shipped to Petrovski Metallurgical Plant for roughing and most are then returned to the Dnepropetrovsk Pipe Mill for finishing. 17/

h. Finishing Rolling Facilities.

Prewar. Before the war, finishing facilities at Dnepropetrovsk Pipe Rolling Mill consisted of the following:

Plate Rolling Mill. This mill was installed originally by a Belgian firm and was rebuilt later by the Kramastorskaya Metallurgical Machinery Factory. The mill had 2 stands, 1 for roughing and 1 for finishing, each of which was 3-high, with roll diameters of 675/550/675 mm. There were two plate cutting machines in the shop. The plate mill had an annual capacity of approximately 50,000 MT.

Universal Rolling Mill. The universal mill produced skelp for the lap-welding and butt-welding shops. Annual capacity was estimated at 45,000 MT.

Lap-Welding Shop. In this installation pipes 76 to 152 mm in diameter were lap-welded from skelp. There were 4 welding machines in the shop, which had an estimated annual capacity of 30,000 MT.

Butt-Welding Shop. There were two butt-welding machines in the shop which produced pipe 12.5 to 73.5 mm in diameter. Annual capacity was estimated at 30,000 MT.

Mannesmann Seamless Tube Shop. Two mills for the production of seamless tubes, 57 to 94 mm in diameter, were installed in the shop in 1931. In addition to piercing and sizing machines, there was a tube-straightening machine. Adjacent to the shop was a cold-drawing shop with ten drawing benches at 60, 30, and 15 MT, respectively. Annual hot-rolled tube capacity was estimated at 50,000 MT. Of this amount approximately 42,000 MT, half hot-rolled and half cold-drawn, were shipped out of the plant. The balance of production was used by the pipe mill in its thin-walled tube department.

Thin-Walled Tube Shop. There were 17 drawing benches and 2 vertical furnaces in the shop. Production capacity was estimated at 6,000 MT per year, or an equivalent of a total length of 6 million m of thin-walled tubes. In the face of the German advance, the thin-walled tube shop was evacuated to Pervoural'sk in the Urals, and it was not returned after the USSR recaptured the plant.

Metal Container Factory. There were 3 departments for the production of containers in the shop: 1 department which produced large containers and had a 450-kg hammer; another which also produced large containers and casings for 100 kg bombs and had the same size hammer; and the third shop which produced small containers and had 5 75-kg hammers and 2 100-kg hammers. There were seven cutting machines. Annual capacity was estimated at 300,000 large containers, 600,000 small containers, and 110,000 bomb casings. 18/

Three sources mentioned the presence of small bar mills in the plant before the war, but there has been no mention of them since. 19/

Postwar Reconstruction. Little information is available on the renabilitation of Dnepropetrovsk Pipe Mill after World War II. In 1946 it was announced that a new electric welding shop had been built and that it would weld tubes 50.8 to 152.4 mm in diameter. 20/ In February 1947 the Mannesmann seamless tube mill went into operation with an annual capacity of 30,000 MT, to be consumed by the petroleum industry. 21/ In May 1947 it was announced that an electric pipe-welding shop had gone into production. 22/

Improvements in Practices. In November 1947 it was announced that (1) the butt-welding process of pipe and tube manufacture had been much improved by controlling the temperature of skelp at a high level by air blast or enrichment by oxygen (O_2), which had resulted in the welding of pipe with a single pass through the welding die or bell, (2) heating of skelp in a three-zone furnace also had been developed, (3) chain-drawing pipe stands were replaced by sizing roll stands, (4) some stands were rebuilt for drawing and welding pipe without pipe carriers, and (5) some of the stands were transformed into movable and oscillating stands. 23/

At Present. Since little damage was sustained by the pipe mill during World War II, it is estimated that present capacities of the mill are approximately the same as those existing before the war, with perhaps some minor improvements in machinery and processes which have resulted in slightly larger capacities.

Type of Finishing Mill	Estimated Annual Capacity (Thousand MT)
Plate Mill	50 to 60
Universal Mill	45 to 55
Lap-welding Shop	30 to 40
Butt-welding Shop	30 to 40
Mannesmann Seamless Tube Shop	44 to 52
Thin-walled Tube Shop	6 to 8

i. Intraplant Services.

Electric power is received by overhead cable from the Donets-Dnepr power network. A transformer station at the plant reduces 6,000-v line voltage to 380 v for plant use. 24/

Water for the operation of installations is piped into the plant area from Petrovski Metallurgical Plant, and drinking water is received from the city of Dnepropetrovsk. 25/

j. Products and Production.

Products. Production at Dnepropetrovsk Pipe Mill is believed to include the same items that were produced before World War II, with the possible exception of items for military use, 26/ as follows: raw steel, special steel, skelp, plate, lap- and butt-welded pipes and tubes, special profile tubing, tubing for aircraft and vehicles, capillary tubing for thermometers, thin tubing for syringes, boilers, metal containers -- including gas cylinders, -- casings for 100 kg bombs, and aircraft fuel tanks

Production.

Production at Dnepropetrovsk

Thousand Metric Tons

Product	1933	1934	1935	1938	1941	1947	Estimate 1952	Estimate 1953
Raw Steel	97.0 27/	101.0 28/	121.8 28/	140.1 27/		195.0 29/	300.0 30/	325.6 30/
Rolled Products		68.5 28/	69.7 28/		87.6 31/		215.0*	224.4*
Pipes and Tubes**								

k. Distribution.

In April 1944, 18 MT of pipe were shipped to the Petroleum Supply, Astrakhan. 32/ In November 1944 the plant was scheduled to ship 31 MT of pipe to Krasny Kotelshchik Plant at Taganrog. 33/ In January 1945 the plant was scheduled to ship 18 MT of pipe to Krasny Kotelshchik Plant at Taganrog on the order of Glavtukbina, Moscow. Before World War II the Dnepropetrovsk Pipe Mill shipped out a rather high percentage of its production, such as sheets, and at the same time it received strip and rounds for pipe manufacture. In 1946 it supplied metal to its tube rolling division independently. 34/ In November 1947, 90 percent of all seamless tubes and pipes made from high-quality steel and with thick walls went to the armed forces. 35/ In February 1951 the Dnepropetrovsk Pipe Mill was sending carloads of pipes and tubes to the Volga-Don Canal Project. 36/ In July 1951 Dnepropetrovsk Pipe Mill was producing large electric-welded pipes for the Kuybyshev GES. 37/ In 1951, steel ingots cast at Dnepropetrovsk Pipe Mill were shipped to Petrovski Metallurgical Plant for rolling and then returned to the pipe mill for processing in the plate, skelp, and tube mills. Special alloy and thin-walled tubing were supplied to

* Based on an average yield of 72 percent.
** There were no estimates of pipe and tube production.

the aircraft industry, and seamless pipe was shipped to the petroleum industry. 38/

l. Plant Efficiency.

The lack of cobalt in 1938, according to a US industrialist, had an adverse effect on the production of tubes at Dnepropetrovsk Pipe Mill. The Russians had difficulty in producing a satisfactory piercing plug for the tube mills. Those used would split and break in the course of a piercing operation. When the US advisers suggested adding cobalt to the composition of the plugs, the Russians replied that cobalt was not available to them. 39/ The Dnepropetrovsk Pipe Mill overfulfilled the 1946 planned target. 40/ In July 1947 the rolling mill of the plant was awarded the Order of Lenin. 41/ In November 1950 it was announced that the Dnepropetrovsk Pipe Mill was the first plant in the Dnepropetrovsk Oblast to fulfill the Five Year Plan. 42/

m. Administration.

The Dnepropetrovsk Pipe Mill is under the direction of the Main Administration of the Pipe Rolling and Pipe Casting Industry, which is part of the Ministry of Ferrous Metallurgy. 43/

n. Personnel.

Number of Employees. In 1941 approximately 7,500 employees were at work at the plant, but in 1951 it was estimated that the number had risen to 10,000. The mill worked 3 8-hour shifts per day. 44/

Administrative Personnel. In 1947 the following individuals held key positions in the plant:

Director of Dnepropetrovsk Pipe Mill was P.V. Savkin (also spelled Salkin).

Chief of the Pipe Rolling Mill was (fnu) Fridland.

Engineer of the Pipe Rolling Mill was (fnu) Frenkel. 45/

o. Locational Characteristics.

No information available.

36. Komintern Steel Combine (Dnepropetrovsk Metallurgical Works; Nizhnedneprovsk Metallurgical Plant).

[redacted] 25X1A2g

The Komintern Steel Combine consists of the following:

Komintern I Rolling Mill,
Komintern II Gray Iron Roll Foundry,
Komintern III Steel Plant and Rolling Mill.

a. Location.

48° 30'N - 35° 02'E. Nizhnedneprovsk, a suburb of Dnepropetrovsk, Dnepropetrovsk Oblast, Ukraine SSR.

Komintern I is north of the Dnepr River and adjacent to the railroad which forms the eastern boundary of the plant.

Komintern II lies parallel to the Sinelnikovo-Donets Basin railroad line and is situated between Komintern I and KominternIII. It is approximately 1 km from the Western Dnepr Bridge.

Komintern III is located approximately 1 km from the left bank of the Dnepr River on the Dnepropetrovsk-Donets Basin railroad line. The Nizhnedneprovsk railway station is approximately 3 km away. 1/

b. History and Development.

Komintern I was built in 1898 by a Belgian named Chaudoir. At a later date the plant was incorporated into the Franco-Belgian organization of the Russian Tube and Rolling Mills. Originally the enterprise consisted of a slabbing mill and strip rolling mill for the production of skelp for the plant which is now called the Dnepropetrovsk Pipe Rolling Mill imeni Lenin. In the early 1900's the sheet metal plants and shovel factory were added. At a later date under Russian direction, the seventh sheet stand was installed, the slabbing mill and the sixth sheet stand were electrified, and the roll turning shop was set up.

Komintern II was constructed in the early 1900's. In 1910 there was a roll foundry, a roll-turning shop, and a power plant, and the plant was owned by an unknown firm which manufactured machinery and tool benches. During World War I the plant cast mortar shells. The plant lay idle from 1917-21, and in 1921 it went back into operation. In 1923 the plant was nationalized and named Kommunar. In 1928 it was renamed Plant II of the Komintern organization. Modernization of the roll foundry, the roll-turning shop, and the shell-working department took place between 1933 and 1935.

Komintern III was built in 1895 by an engineer named P. Lange. In 1897 Lange formed a corporation called Yekaterinoslav Tube and Iron Rolling Mills, which had a capitalization of 1.2 million rubles. Originally the plant had 2 small 20-ton open-hearth furnaces, 3 roll stands for commercial iron, and a tube-welding installation. In 1925 the strip mill, and a little later, the wire mill, were modernized. The 2 open-hearth furnaces were rebuilt and enlarged in 1929 and 1932, and open hearth No. 2 was rebuilt completely again in 1940.

The Komintern Combine was damaged severely during World War II. Restoration and reconstruction began shortly after the Soviet Army recaptured the installations from the Germans. 2/

c. Raw Materials and Other Inputs.

Komintern I.

Prewar. Steel in 700-kg ingots came from Komintern III, the Combine's own steel mill. Slabs came from Kamenskoye (now called Dneprodzerzhinsk).

The following amounts were received each month:

Ingots for the slabbing mills	10,000 MT
Slabs for the sheet mills	1,500 MT
Total	11,500 MT

Fuel oil, 50 to 60 MT per month, came by rail from the Caucasus. 3/

At Present. There is no recent information on the sources of raw materials for use in Komintern I.

Komintern II.

Prewar. Approximately 7,500 MT of hematite pig iron were received each month. Of this amount 40 to 50 percent was charcoal pig iron from the Asha and Alapayevsk plants in the Urals. The balance was received from Petrovski Metallurgical Plant in Dnepropetrovsk, from the DZMO blast furnaces, and, occasionally from Kramatorsk. Gray iron scrap was supplied by the scrap reclamation dump nearby. The scrap came from the Donets region and from mills in the Dnepr Bend area. Sand for making molds in shipments of approximately 40 MT per month, came from Guzarovka in the Donets Basin. Clay, in amounts of approximately 50 MT per month, originated in the immediate vicinity of the plant. Black graphite, in amounts of 12 to 15 MT per month, came from the Urals by rail, and gray graphite, 12 to 15 MT per month, came from the Donets Basin. Fuel oil, consumed at the rate of approximately 800 MT per month, was shipped in by rail from an unknown source. 4/

At Present. There is no recent information on the source of raw materials for Komintern II.

Komintern III.

Prewar. Pig iron came from Petrovski Metallurgical Plant in Dnepropetrovsk and Dzerzhinskogo. Iron ore came by rail from Krivoy Rog. Scrap iron and steel came from the local collection dump. Fuel oil came from an unknown region. In the open-hearth furnaces, consumption averaged 210 kg per ingot ton produced. 5/

At Present. There is no recent information on the sources of raw materials and other inputs for Komintern III.

d. Coal and Coke.

Komintern I.

Prewar. In 1941, coal was being consumed at the rate of approximately 10,770 MT per month, of which 1,200 MT went to employees of the mill for heating purposes. There was no mention of coke. 6/

At Present. There is no information on the sources and consumption of coal and coke at Komintern I.

Komintern II.

Prewar. Sources of coal and coke were not mentioned, but in 1941 coke was being consumed at the rate of 360 MT per month, anthracite coal for the use of employees for heating at 260 MT per month, charcoal for scattering on the metal as it cooled at 2 to 3 MT per month, and coal refuse from 250 to 300 MT per month. 7/

At Present. No information available.

Komintern III.

Prewar. The source of the coal supply for Komintern III was not mentioned, but in 1941 coal was being consumed at the rate of 2,860 MT per month. 8/

At Present. No information available.

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

Prewar. Open-hearth furnaces for the production of steel are located in Komintern III. Several reports mentioned 3 to 5 open hearths, but it is believed that there were only 2 furnaces for the production of steel at the plant. These furnaces were 80-ton, oil-fired Siemens-Martin.

Furnace No.	Hearth Area (Sq M)
1	34.85
2	40.0 9/

At Present. A publication stated in 1946 that in the reconstruction of Komintern III a new open-hearth division was under construction which would be larger than that which was in operation before World War II. 10/ No other information on the new open-hearth shop is available.

Two furnaces, with capacities of approximately 85 MT to 100 MT, are in operation at the present time.

Estimated 1952 Steel Production at Komintern III*

Open Hearth No.	Hearth Area ((Sq M)	Coefficient	Operating Days	Production (Thousand MT)
1	34.85	5.0	325	56.6
2	40.0	5.0	325	65.0
Total Steel Production				121.6

Estimated 1953 Steel Production at Komintern III*

Open Hearth No.	Hearth Area (Sq M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
1	34.85	5.2	325	58.9
2	40.0	5.2	325	67.6
Total Steel Production				126.5

g. Primary Rolling Facilities.

Komintern I.

Prewar. 700-kg ingots from Komintern III were heated in a double-row gravity discharge furnace which had a hearth area of 80 sq m and an output of 18 to 20 MT per hour. The furnace was coal-fired with oil used as an auxiliary fuel. The ingots were transferred to the slabbing mill by electric trolley. The slabbing

* See Appendix C, Methodology, for use of coefficient in estimating production.

mill consisted of 1 roughing stand and 1 finishing stand, 3-high. The roughing stand had steel rolls and an electric tilting table. The diameter of the inside roll was 750 mm. The same specifications applied to the finishing stand, with the exception that it had cast-iron rolls. The roughed slabs, 120 mm thick, were cut on hand-operated hydraulic shears. The sinkhead was cropped, and the slabs were sheared into two parts. They then passed over 2 electric roller beds to a second gravity discharge furnace with a heating capacity of 18 MT per hour. The reheated material passed over another electric roller bed to the finishing stand, which was on a line with the roughing stand and was run by the same motor. Shifting and lifting tables were present. From the finishing stand the slabs traveled over another electric roller bed to an electric saw. After cutting, the slabs were transported on a skid conveyer to another electric roller bed to an electric shear, which cut them to the desired size. 11/

At Present. There is no information on the restoration and reconstruction of the slabbing mill, which was damaged during World War II.

h. Finishing Rolling Facilities.

Komintern I.

Sheet Mill. There were 6 separate rolling mills, each with 3 stands. Two roll lines were powered by 800-hp electric motors and the others by 450-hp steam engines.

Cutting Department. There were 15 plate shears in operation.

Cold Rolling Mills and Sheet Processing. The following amounts of steel sheet were processed each month:

	Metric Tons
Sheet Metal for Finishing Purposes (710 x 510 mm Final Dimensions)	800
Sheet Metal for Tin Plating (710 x 510 mm Final Dimensions)	400

	Metric Tons
Sheet Metal for Tin Plating (710 x 142 mm Final Dimensions)	100
Total	1,300 MT per Month

There was one separate, seven-stand, 650-mm mill in the building run by a 400-hp steam engine.

Pickling Plant. There were 3 pickling units, steam-operated, each of which had 1 pickling and 1 washing tank. Sulphuric acid was used as the pickling agent. The plant had a pickling capacity of 4,000 MT per month.

Annealing Plant. There were 6 annealing furnaces in operation and 1 which had not been completed. All furnaces were shipped with traveling grates. Annealing capacity was 6,900 MT a month.

Furnace No.	Hearth Area (Sq M)
1	15.6
2	19.4
3	21.65
4	19.6
5	19.5
6	19.6

Galvanizing Plant. There were four galvanizing machines in the plant. Two processes were used: (1) with aluminum supplement (zinc-aluminum-tin alloy) zinc chloride as a fluxing agent, for use of the Ministry of War; and (2) with aluminum chloride as a fluxing agent, for the general market. Production amounted to 2,200 MT per month.

Tin-Plate Plant. There were 13 tin stacks in the plant, each of which had a capacity of 600 MT per month.

Shovel Factory. This department contained 4 eccentric presses, 6 friction presses, 10 punching presses, 6 presses for bending the shovel blades, 8 polishing benches, 2 lathes, and 1 planer. Output was 640 shovels per month.

Metalware Factory. The metalware factory manufactured black and galvanized buckets and iron basins. 12/

At Present. No information available.

Komintern II.

Prewar.

Roll Foundry. The roll foundry contained 4 reverberatory furnaces, 1.9 m wide, 7 m long, and 1.7 m high, with a hearth area of 13.3 sq m. Output was 25 MT of molten cast iron every 24 hours. Six cupola furnaces were also in the shop.

Cupola No.	Inside Diameter (MM)	Outside Diameter (MM)	Production per Hour (MT)
1	900	1,400	5
2	700	1,000	4
3	900	1,400	7
4	900	1,400	7
5	700	1,100	6
6	700	1,100	6

Furnaces Nos. 1 and 2 were not in general use. They served only when the rolls were cast for the pouring of hot metal (top casting) to prevent piping in the rolls, which were bottom cast.

There follows an example of the mixture used for chilled rolls: 60 percent foundry pig iron, 30 percent cast-metal scrap, 5 to 8 percent fluxing agent, 5 to 8 percent rail sections. For definite chilled rolls: up to 50 percent foundry pig iron, and up to 40 percent cast-metal scrap; the remainder was fluxing agent and rail scrap.

Roll Processing Shop. This department contained 35 roll lathes, 5 roll-killing machines, and 4 grinding machines.

Production. The following production was being realized each month before World War II:

Product	MT per Month
Cast Iron Rolls	2,200
Steel Rolls	200
Ingot Molds	500
Base Plates	300
Small Castings	50
Miscellaneous	120
Total	3,370 13/

At Present. No information available.

Komintern III.

Prewar.

Light Section Mill. The light section mill consisted of 2 500-mm roughing stands, and 7 260-mm finishing stands. A 1,500-hp, double-acting, tandem steam engine drove -- in addition to the roughing mill -- the finishing mill to which power was transmitted by a belt. There was one double-row gravity discharge furnace with a hearth area of 46.4 sq m, which was fired by coal and some fuel oil. Output of the mill was approximately 2,100 MT per month.

Rod Mill. The rod mill consisted of 2 roughing stands with rolls 550 mm in diameter, 3 intermediate stands with rolls 350 mm in diameter, and 7 or 9 finishing stands with rolls 280 mm in diameter. The mill was powered by three motors. Production amounted to 6,500 MT per month. 14/

At Present. No information available.

i. Intraplant Services.

Komintern I.

Prewar.

Electric Power. Approximately 2,000 kw, including current for lighting purposes, and the like, are generated. This amount just covered plant requirements. There was one steam turbine and a 2,000-kw generator. There was also a 100-kw DC generator driven by a steam engine and used for lighting purposes, a generator of unknown performance, two 340-kw dynamos, and one 440-kw dynamo.

Steam Production. There were 3 boilerhouses, as follows:

Boilerhouse No. 1 contained 3 Babcock-Wilcox boilers, each 183 sq m, 215 tons of steam, 7 atm; and four Matteau boilers, each 208 sq m, 2.5 tons of steam, 7 atm.

Boilerhouse No. 2 contained two Babcock-Wilcox boilers, each 160 sq m, 1.9 tons of steam, 7 atm; and one Russian-built boiler, 136 sq m, 1.6 tons of steam, 7 atm.

Boilerhouse No. 3 contained one Kestner boiler, 250 sq m, 7 tons of steam, 12 atm; and two Babcock-Wilcox boilers, each 400 sq m, 8 tons of steam, 12 atm.

Water Supply. Approximately 12,300 cu m of water were consumed each day. The plant had its own pumping station on the Dnepr, but there was no system for water purification. 15/

At Present. No information available.

Komintern II.

Prewar.

Electric Power. Electric current came from Komintern I and Komintern III. 16/

At Present. No information available.

Komintern III.

Prewar.

Electric Power. Sources of electric power were not described. Consumption was as follows:

	Kw
Open-Hearth Furnaces	400
Wire Mill	1,200
Strip Mill	150
Miscellaneous	250
Total	2,000 Kw

Water Supply. Four pumps pumped water, probably from the Dnepr River, to installations. The open-hearth furnaces consumed 12 cu m of water for each ingot ton of steel produced, and the rolling mill consumed 6.8 cu m of water for each ton of steel rolled.

Compressed Air. There was one 20-cu m per hour compressor. 17/

At Present. No information available.

j. Products and Production.

Komintern I.

Prewar. Products included the following: black plate, galvanized sheet, corrugated sheet, cold rolled sheet, hot dip tin plate, casing iron, and shovels. 18/

At Present. In 1951, production at Komintern I included the following: sheet for building enterprises, sheet for agricultural machinery plants, and tin plate for the canning industry. 19/

Komintern II.

Prewar. Products included the following: chilled cast iron rolls, steel rolls, ingot molds, base plates, small castings, and metalware. 20/

At Present. No information available.

Komintern III.

Prewar. Products included the following: steel ingots, light sections, rolled wire for electrodes and telegraph lines, and commercial rolled wire. 21/

At Present. Products include the following: steel, light sections, and rolled wire. 22/

Production.

Production at Komintern

Thousand Metric Tons

	1934 23/	1935 23/	1952 24/	1953 24/
Steel	108.6	125.5	121.6	126.5
Rolled Products	120.8	143.1	87.5	92.0

k. Distribution.

Some information on the distribution of products produced at Komintern in the years following World War II is as follows: In November 1947, 8-mm wire was being shipped to the Nizhnedneprovsk Wire and Nail Plant. 25/ In June 1951 it was announced that electric wire was being shipped to the Volga-Don project. 26/ In July 1951 an order from the Kakhovka site for 60 MT of armature wire was fulfilled. 27/ In July 1951, Komintern had sent 500 MT of rolled metal goods to the Volga-Don Canal, and it was announced that this was the order for the third quarter of the year. 28/

l. Plant Efficiency.

No information available.

m. Administration.

The plant is under the direction of the Ministry of Ferrous Metallurgy.

n. Personnel.

Number of Workers. In 1937 it was claimed that 17,000 workers were employed in the enterprise. 29/ and in 1941, just prior to the German invasion of the Ukraine, it was estimated that 6,250 workers were employed. 30/ In September 1948 it was reported that 5,800 workers were at the combine. 31/

Administrative Personnel.

No information available.

o. Locational Characteristics.

No information available.

37. Nizhnedneprovsk Metallurgical Plant and Tube Mill imeni Karl Liebknecht. [redacted] 25X1A2g

a. Location.

48° 29'N - 35° 05'E. Nizhnedneprovsk, a northern suburb of Dnepropetrovsk, Dnepropetrovsk Oblast, Ukraine SSR. 1/

b. History and Development.

In the early 1900's, Bernhard Handtke, a Swiss, opened a small nail factory in Yekaterinoslav (former name of Dnepropetrovsk). In 1905-06 the company factory was transferred to Nizhnedneprovsk, and it began the manufacture of cold and hot pressed bolts, nuts, rivets, and railroad spikes. In 1909-10 the plant was sold to the Russian Iron Industry Corporation in Gleiwitz, and 90 percent of its capital was held by Germans. A tube mill was built in 1911-12 and placed in operation in 1913. In 1914 the plant became Russian property by sequestration. In 1917 the enterprise was sold by the Kerensky administration to the South Russian Association of Metallurgical Plants. In 1919-20 the plant was nationalized by the USSR, but operations were not begun until 1922. The tube mill went back into production in 1925, and in the same year the plant received its present title. Modernization and expansion of facilities began in 1929, with dates of completion as follows:

1929 A small open-hearth furnace.

1930 A department for the manufacture of metal cylinders.

1931 A shell plant, which manufactured cartridges during World War II.

1932-35 A new open-hearth shop with four furnaces.

1934 A railroad wheel rolling mill.

1935 A new tube mill.

1941 Plant No. 5 for the production of bombs.

In 1939 the Nizhnedneprovsk Wire and Nail Plant was separated completely from the other departments of the plant and was placed under the direction of the Chief Directorate of Metal Products (Glavmetiz) in Moscow.

World War II destruction of the metallurgical plant was considerable; estimates of war damage ranged between 60 and 80 percent. Reconstruction began in 1945, and by early 1950 the plant was restored almost completely. 2/

c. Raw Materials and Other Inputs.

Prewar. Raw materials came from the following sources: pig iron was received from Petrovski and Kamenskoye (now Dneprodzerzhinsk), special steel ingots came from Zaporozh'ye and Stalingrad, manganese ore came from Nikopol', and fuel oil was shipped in by rail from the Baku oilfields. 3/

The consumption of fuel oil in 1940 was as follows:

Installation	Metric Tons
Steam Generation	287
Open-Hearth Shop	70,149
Tube Works No. 1	5,688
Tube Works No. 2	11,235
Railroad Wheel Mill	10,931
Foundry	37
Auxiliary Plants	32
Plant No. 5	4,225
Sold Outside Plant	130
Total	102,714 4/

At Present. Sources of raw materials and other inputs are believed to be the same as those in the prewar operation of the plant. 5/

d. Coal and Coke.

Coal for use at Nizhnedneprovsk Metallurgical Plant comes from the Donets Basin. 6/

Coal Consumption at Nizhnedneprovsk Metallurgical Plant in 1940

Installation	Metric Tons
Open-Hearth Shop	283
Tube Mill No. 1	6,390
Steel Foundry	173
Railroad Operation	7,528
Scrap Metal Crushing	1,259
Forges	442
Auxiliary Uses	1,571
Plant No. 5	5,338
Heating for Schools, Nurseries, and the Like	1,466

Installation	Metric Tons
Heating for Workers' Homes	13,285
Boilerhouses	21,264
Total Coal	58,999
Coal "Waste" for Boilerhouses Only	75,365
Coal "Waste" for Plant No. 5	2,272
Coal "Waste" for Miscellaneous Operations	990
Total Coal "Waste"	78,627 7/

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

Prewar. There were five oil-fired open hearths in operation at Nizhnedneprovsk before the war. These furnaces were built before the war. These furnaces were built between 1929 and 1935 and reportedly were operated efficiently.

Description	Furnace Number 1	2	3	4	5
Length (M)	10.87	10.87	10.87	11.25	12.70
Width (M)	4.00	4.00	4.00	4.00	4.40
Hearth Area (Sq M)	43.60	43.60	43.60	45.00	56.00
Hearth Depth (M)	0.90	0.90	0.90	0.83	1.10
Arch Height above Charging Doors (M)	2.80	2.80	2.80	2.76	2.67
Total Height	3.70	3.70	3.70	3.59	3.77
Furnace ports	Venturi				
Cross Section of Air Channels (M)	2 x 1.1	2 x 1.1	2 x 1.1	2 x 1.1	2 x 1.1
Width of Charging Doors (M)	1.23	1.35	1.23	1.35	1.1
Capacity (MT)	155	95	155	95	150

Production for 1940 amounted to 364,000 MT of steel. Planned produttion for 1941 was 450,000 MT. Capacity of the 5 furnaces was estimated to be 500,000 MT.

In 1950, production of the open-hearth furnaces was distributed as follows:

		Metric Tons
Steel for Railroad Disc Wheels, 12-Sided Ingots, 3.5 MT Each		148,000
Tire Steel for Nizhniy Tagil		2,000
Tube Steel		126,000
Tube Steel for Mariupol' (now Azovstal)		38,000
Molten Steel for Steel Foundry		4,000
Steel Ingots for Plant Forgings		1,000
Ingots for Shipments, 5 to 8 MT		45,000
(For Kamenskoye (now Dneprodzerzhinsk)	24,000)	
(For Makeyevka	12,000)	
(For Petrovski	7,000)	
(For Zaporozh'ye	2,000)	
Total		364,000 8/

Reconstruction. Restoration of open-hearth furnaces began shortly after the Soviet Army recaptured the plant. Reconstruction of No. 1 furnace was completed in May 1946, and that of No. 2 was well under way. The two furnaces, however, were not fired until August 1947, when the casting of ingots for the railway wheel mill began. By July 1948, reconstruction of open hearth No. 3 was completed, and in November 1948, No. 4 was placed in operation. By the end of 1948 all five open-hearth furnaces were restored and in production. 9/

Improvements in Practices. In 1947, metallurgists at Karl Liebknecht had completed 8 steel smeltings directly from ore and had familiarized themselves with the production of 2 kinds of instrument steel. 10/ In July 1948, workers pledged to achieve a steel output of six MT for each square meter of hearth area in open hearths Nos. 1 and 2 during the second half of 1948. 11/ In 1950 it was claimed that 5 open hearths were realizing 5.6 MT for each square meter of hearth area. 12/ In June 1951 the average steel coefficient for the preceding 2 years was claimed to be 5.57 metric tons. 13/

At Present. Five open-hearth furnaces, with dimensions approximately the same as existed before World War II, are in operation at Nizhnedneprovsk.

Estimated 1952 Steel Production at Nizhnedneprovsk*

Open Hearth No.	Hearth Area (Sq M)	Coefficient	Operating Days	Production (Thousand MT)
1	43.6	5.57	325	78.9
2	43.6	5.57	325	78.9
3	43.6	5.57	325	78.9
4	45.0	5.57	325	81.4
5	56.0	5.57	325	101.4
Total Steel Production				419.5

Estimated 1953 Steel Production at Nizhnedneprovsk*

Open Hearth No.	Hearth Area (Sq M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
1	43.6	6.0	325	85.0
2	43.6	6.0	325	85.0
3	43.6	6.0	325	85.0
4	45.0	6.0	325	87.7
5	56.0	6.0	325	109.2
Total Steel Production				451.9

* See Appendix C, Methodology, for use of coefficient in estimating production.

g. Primary Rolling Facilities.

A blooming mill is in operation at the plant, but no description is available.

h. Finishing Rolling Facilities.

Prewar. The following rolling mills were in operation at the plant before World War II:

(1) Tube Mill No. 1, often referred to as the old tube works, consisted of the following:

Bride Rolling Mill, where ingots were heated in 2 gravity-discharge furnaces from 6 to 12 hours, at temperatures ranging from 1,150°C to 1,250°C, depending upon the type of steel. The ingots were transported from the furnaces to the Mannesmann Mill by traveling tongs.

Mannesmann Mill, which consisted of 1 stand of 4 rolls, 2 of which were working rolls. It was built by Demag of Germany and installed in 1913. The bloom traveled to storage on roller beds where it was cooled and, in most cases, re-cleaned. Blooms were heated in two gravity-discharge furnaces, each serving a Bride mill.

Large Bride Rolling Mill, which produced tubes 114 to 273 mm in diameter. Output varied according to the quality, but the average output was 45 tubes per hour. Small Bride Rolling Mill, which produced tubes 100 to 170 mm in diameter. The average output was 3 MT per hour. Production of the 2 Bride mills averaged 2,500 MT per month. In 1940, production was 23,445 MT, and the target for 1941 was set at 33,800 MT. Alloy and nonalloy special steels were rolled into tubes on both Bride mills in order to eliminate losses encountered in the slow heating and slow cooling. After rolling, the finished tubes went into cooling pits, where they remained 24 hours or more. The tubes were then cut into size -- two sections, each 1.5 m long, including the rings which were taken from each section for metallurgical tests. The tubes were then placed in heat-treating pits at a temperature of 600°C and heated to 850°C. After quenching, the rings were cut off. Tubes for making mortars were allowed to cool in the open air and not in cooling pits.

Mannesmann Seamless Tube Mill consisted of a 455-MT horizontal hydraulic Erhardt press, a 2-high, 2-stand Swedish rolling mill, and a small 1-stand pilgrim step mill. Ingots, usually 160 mm square, were pierced on the press, rounded on the Swedish mill, and finished on the pilgrim step mill. Tubes 70 to 115 mm in diameter were produced, which were used almost exclusively by the aircraft engine building industry.

(2) Tube Mill No. 2 was also referred to as the new tube works. Ingots from the plant's open-hearth furnaces were transported from storage to the reheating furnaces on roller beds. The furnaces were 2 double-row, gravity-discharge furnaces which had a monthly capacity of approximately 11,000 MT of ingots. From the reheating furnaces the ingots were transported on roller beds to the mill, which consisted of 1 stand, four rolls, with the diameter of the working rolls 550 and 650 mm. The tubes left the mill, passed over roller beds to the hot shears, and on to the annealing furnaces. From the annealing furnaces they went to the sizing mill, on to the hot-straightening machine, and finally to the cooling bed. Yearly output of 6- to 8-inch tubes amounted to approximately 100,000 MT. The 1941 target called for a production of 100,783 MT.

(3) Railroad Wheel Rolling Mill was built by Davy-Sheffield in England in 1932-34, and processed ingots weighing 3.5 to 3.7 MT. Equipment of this mill consisted of the following:

Five Schiess de Fries and five Kreven machines for cutting ingots.

Two presses.

Two gravity-discharge furnaces for preheating ingot sections to a rolling temperature of 700°C to 800°C.

Two charging machines for moving the sections out of the furnaces into the chamber furnaces and on to the 3,000-MT press, where they were shaped into rough discs and where rough holes were made.

A revolving crane for shifting the wheels from the 3,000-MT press to the 7,000-MT press for further rough-shaping of the wheels.

A one-sided suspension crane for shifting the discs to the 2,500-MT press for final shaping and on to the 4 hardening and tempering tables, where water was sprayed on the treads.

Tempering furnaces and cooling pits for the slow cooling of the discs and prehardening treads.

Reheating furnaces for final correction of hardness, rigidity, and the like.

15,000 MT of ingots were processed each month, or 180,000 MT per year. 9,400 MT of wheel discs were rolled each month, or 113 MT per year. Planned production of wheels for 1941 was 260,000 MT.

(4) Metal Container Factory. This department of the plant was built in 1930 and produced 369,000 units of 40-liter standard containers for oxygen, carbon dioxide, hydrogen, and other gases. Some bomb casings also were produced.

(5) Plant No. 5 for the Production of Bomb Casings. There were four Beche hammers in the shop. Under normal conditions each hammer was supposed to produce 4,000 bomb casings per month, or a total of approximately 200,000 bombs per year.

(6) Plant No. 6. A department was under construction for the production of consumer goods, such as bedsteads, from tube scrap, but it had not been completed. 14/

Reconstruction.

Tube Mill No. 1. It is not believed that Tube Mill No. 1 was restored. 15/

Tube Mill No. 2. In November 1947, workers at Nizhnedneprovsk promised Stalin that the tube mill would be restored shortly, and in December it was broadcast that the restoration of the mill would be the main project for the installation in 1948. In August 1948 the first successful attempt to produce pipes and tubes was made, and it was announced that full production of seamless pipe began with a large ceremony on 1 September. 16/

Railroad Wheel Rolling Mill. In August 1947 it was announced that the restoration of the wheel mill was one of the most important construction projects of the postwar Five Year Plan, and that it was scheduled to have the latest equipment for the manufacture of thousands of seamless rolled wheels for railroad stock. Restoration, however, was being retarded by the inefficient operation of the Dnopropetrovsk Industrial Construction Combine and by the inefficient use of building materials. In September 1947 it was announced that the Moscow plant Podemnik, an important producer of equipment for metallurgical enterprises, was working on the construction of a large crane for use at the Nizhnedneprovsk wheel plant. In November 1947, workers of the plant reported the restoration and commissioning of the wheel rolling mill, and in September 1948 it was reported that the production schedule of the plant called for 100,000 seamless car wheels per year. 17/

Improvements in Practices. In October 1948, 5 percent of the finished wheel production and 10 percent of the finished tube production were waste. 18/ In August 1949 it was announced that workers in the seamless pipe mill were losing time because of the rapid wear of the textelite bearings which supported the rollers of the mill. Workers of the Kuybyshev works in Zhdanov showed the Karl Liebknecht workers how to prepare bearings made of pressed wood which, it was claimed, lasted 20 times longer than the old variety. 19/

At Present. The present status of the finishing mills is as follows:

Tube Mill No. 1 is not believed to have been reconstructed.

Tube Mill No. 2 was completely restored and is probably producing seamless tubes at the rate of 100,000 to 125,000 MT per year.

Railroad Wheel Rolling Mill is believed to be in full operation and to be producing seamless railroad car wheels at the rate of 200,000 to 250,000 MT per year.

Metal Container Factory was probably restored, but no estimate of yearly production can be made.

Plant No. 5 for the production of bomb casings was probably reconstructed and placed in operation, but no estimate of yearly production can be made.

Plant No. 6 for the production of consumer goods from waste tubes was probably completed for the production of a limited amount of consumer goods.

i. Intraplant Services.

Electric Power.

Prewar. Before World War II the Nizhnedneprovsk Metallurgical Plant had a 17,000-kw hook-up. Actual consumption of electricity amounted to 12,000 to 13,000 kw, part of which were generated in the plant's own power plant, while the balance came from the Dnepr-Donets power system. Within the plant area there were 6 turbogenerators, built in 1912, each of which had a rated output of 500 kw, and which were driven by 3 turbines. There was also a 2,050-kw turbogenerator, built in 1928, which generated 3,100 volts AC. 20/

Reconstruction Period. By November 1949 the electric power system consisted of the following: A high tension line carried power from Zaporozh'ye on the Dnepr-Donets system to the main transformer station, where the voltage was stepped down from 220,000 v to 5,000 v. The main electric switch station, which distributed current by undergound cables, without changing the voltage, to various small transformer stations. 21/

At Present. The electric power system is believed to be approximately the same as that described above.

Steam Boilers. At the time of the German occupation of the plant, there were 2 boilerhouses,with a total of 12 boilers for the production of electric current, each of which had a heating surface of 300 to 400 sq m and operated at 8 to 12 atm pressure. A third boilerhouse was located in the Railroad Wheel Rolling Mill and produced steam for the presses. Each of the 2 boilers in the third boilerhouse had a heating surface of 400 sq m and operated at 13 atm and 350°C. Two other boilerhouses had a total of 8 boilers, operated at 2 to 5 atm, which furnished steam for the steam hammers and heat. 22/

Compressed Air. In 1941 there was a total of 18 modern compressors, all but 2 of which had been removed by the Russians. 23/

Water Supply. In 1941 the normal water requirements amounted to 8,000 cu m per day, and there was a total of 5 relay pumping stations and 25 pumps. In August 1948 it was announced that the dam which supplied water to Nizhnedneprovsk Metallurgical Plant had been restored. Up to the end of 1949 it was claimed that there was always trouble with the water supply. Pressure was never sufficient to service the installations. 24/

Mechanical and Forge Shop. In 1946 it was announced that a large mechanical and forge workshop was under construction at the plant; this would increase the possibilities for accomplishing repairs within the installation. 25/

j. Products and Production.

Products. The following products are produced at the Nizhnedneprovsk Metallurgical Plant: steel, railroad wheel discs and wheels, seamless pipe and tube of various sizes, metal containers, and possibly aircraft bomb casings. 26/

Production.

Production at Nizhnedneprovsk
1934-1953

Thousand Metric Tons

Year	Steel	Rolled Products
1934	196.1 27/	
1935	260.1 28/	29.3 34/
1936	341. 29/	
1937	381.7 29/	
1938	362. 29/	
1940	364. 30/	
1941	340.8 31/	85.2 30/
1949	450. 32/	
1950	435. 33/	300. 35/
1952	419.5 36/	300. 36/
1953	451.9 36/	325.3 36/

k. Distribution.

In November 1948, seamless pipe was being shipped to the oil fields in the Caucasus. 37/ In 1950 and 1951 the plant was producing drive pipe for the Volga GES. 38/ In March 1951, several carloads of pipe for the drilling wells at the Kakhovka Station were sent by the Nizhnedneprovsk Metallurgical Plant. 39/

l. Plant Efficiency.

No information available.

m. Administration.

Nizhnedneprovsk Metallurgical Plant and Tube Mill belongs to the Dnepr Group of Plants in the Southern Metallurgical Region and operates under the direction of the Ministry of Ferrous Metallurgy. Reconstruction of the plant after World War II was under the guidance of the Dneprovskpromstroi Trust of the Ministry of Construction of Heavy Industrial Enterprises. 40/

n. Personnel.

Employees. Nizhnedneprovsk employs approximately 12,000 workers on 3 shifts, 7 days a week. 41/

Administrative Personnel. As of October 1950 the Director of the Nizhnedneprovsk Metallurgical Plant and Tube Mill was F. Balakin. 42/

In November 1947 the Chief Engineer of the plant was S. Stupel and the Secretary of the Communist Party was A. Stetsonko. 43/

o. Locational Characteristics.

The plant is completely surrounded by a wooden fence, with searchlight towers every 500 yards. Passes are required for admission. 44/

38. Nizhnedneprovsk Wire and Nail Plant (Mitisni Zavod; Dnepropetrovsk Nail Factory). [redacted] 25X1A2g

a. Location.

48° 29'N - 35° 05'E. Nizhnedneprovsk, a suburb of Dnepropetrovsk, Dnepropetrovsk Oblast, Ukraine SSR. The plant is located on the south side of the Nizhnedneprovsk Metallurgical Plant and Tube Mill imeni Karl Liebknecht, and north of the double-track rail line, Dnepropetrovsk-Khar'kov. Two sidings from the rail line lead into the plant. 2/

b. History and Development.

For the early history of the plant see Nizhnedneprovsk Metallurgical Plant and Tube Mill imeni Karl Liebknecht. There is no information available on the history of the plant after its administration was separated from that of Nizhnedneprovsk Metallurgical Plant and Tube Mill.

c. Raw Materials and Other Inputs.

Rolls of wire and round and hexagonal bars for wire rod are received from unknown sources by rail. 3/

d. Coal and Coke.

In 1949, 1 train of 20 cars arrived each week with coke from an unknown source. 4/

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

None.

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

The following information on finishing facilities at the Nizhnedneprovsk Wire and Nail Plant concerns the installations as they were found at the time of the German occupation during World War II. It is believed that the plant was reconstructed by the USSR, but the facilities in operation at the present time are not known. 5/

Wire Mill No. 1 contained a rough-drawing department with 81 drawing drums, an intermediate-drawing department with 37 drawing drums, and a fine-drawing department with 77 drawing drums. This mill also contained a pickling plant which had a capacity of 100,000 MT per year, annealing ovens, and a lacquering shop for treating telegraph wire.

Wire Mill No. 2 produced barbed wire from finished wire made in Wire Mill No. 1. There were 54 draw benches in the mill.

Wire Mill No. 3 had 66 drawing drums.

Telegraph Wire Factory. The building to house this department was still under construction. The drawing, pickling, and galvanizing departments were to be placed in this new plant.

Nail Factory. There were 194 nail machines installed, of which 22 old ones were kept in reserve, and 29 polishing benches.

Electrode Plant contained seven benches and a machine for the heavy coating of electrodes.

Cold Stamping of Bolts, Nuts, and Rivets. There was a pickling tank, 3 draw benches, a tapering hammer, 4 shears, 22 friction presses, and 14 nut presses.

Thread-Cutting Department. This department contained 4 trimming machines for bolts; 5 thread-rolling benches; 20 threat-cutting benches for bolts; 5 threading benches for railroad bolts; 19 thread-cutting benches, each capable of handling 6 nuts simultaneously; and 23 automatic machines for nut-cutting.

Railroad Spike Plant. This building contained 20 friction presses, 4 shears, 13 tapering benches, and 8 trimming machines.

Hydrous Ferrous Sulphate Plant.

Tool Construction Department.

i. Intraplant Services.

Electric power was received by overhead cable from an unknown source. 6/

j. Products and Production.

The average monthly production for the first half of 1941 follows:

	Metric Tons
Electrode Wire	74
Commercial Wire	919
Fine-Gage Wire	159
Telegraph and Cable Wire	1,710
Total Wire	2,862
Barbed Wire	523
Building Nails	1,831
Special Nails	111
Molding Nails	23
Total Nails	1,965
Electrodes	1,139
Railroad Spikes	2,124
Commercial Bolts with Nuts	363
Commercial Bolts for Railroads	597
Loose Nuts	66
Rivets	188
Special Nails	10
Total Nuts and Bolts	1,224
Total Production	9,837 7/

On the basis of the above monthly average for the first 6 months of 1941, total 1941 production is estimated at 144,000 MT. Assuming that the plant was restored at least to its prewar capacity, 1952 production is estimated at 145,000 MT. There is no change estimated for 1953.

k. Distribution.

No information available.

l. Plant Efficiency.

No information available.

m. Administration.

In 1939 the Nizhnedneprovsk Wire and Nail Plant was placed under the direction of the Chief Directorate of Manufacture of Metal Products (Glavmetiz) in Moscow. 8/

n. Personnel.

In 1941, 2,983 persons were employed in the plant. 9/

o. Locational Characteristics.

A brick wall, 2.5 to 3 m high, is on the northwest side of the plant. A wooden fence surrounds the rest of the plant. There were two wooden watch towers overlooking the area. Passes are required for admission to the plant. 10/

39. Petrovski Metallurgical Plant (Dnepropetrovsk Metallurgical Plant; Aleksandrovski Metallurgical Plant; Yekaterinoslav Metallurgical Plant). [redacted] 25X1A2g

a. Location.

48° 29'N - 34° 59'E. Dnepropetrovsk (formerly Yekaterinoslav), Dnepropetrovsk Oblast, Ukraine SSR. The plant, in the northwest part of the city, is approximately 900 m south of the Dnepr River, which forms the northern boundary of Dnepropetrovsk. The plant lies directly across the railroad tracks from and immediately south of the Dnepropetrovsk Steel Fabricating Plant imeni Molotov, and is adjacent to the Dnepropetrovsk Pipe Rolling Mill imeni Lenin. The plant is surrounded by workers' settlements and by the suburbs of the town, which have hindered the development and expansion of the steel mill. 1/

b. History and Development.

Petrovski Metallurgical Plant was constructed originally in the 1880's. Before World War I it was one of the largest and most modern steel plants in Russia. Administered by the Bryansk Metallurgical Company, Petrovski had a multiphased and well-rounded production program, consisting of blast furnaces, Bessemer converters, two open-hearth shops, a blooming and slabbing mill, and several finishing mills. Finished products included rails, girders, plate, sheet, and structural shapes. The mill was nationalized in 1922, and shortly thereafter it received its present name. For a short period, until 1933, Petrovski Metallurgical Plant and the Dnepropetrovsk Pipe Mill were under the same management.

Plans for the modernization of Petrovski were part of the Second Five Year Plan, and 57.9 million rubles were earmarked for investment in the plant; of this amount, 13.4 million rubles were invested in 1936. New capacities were planned for the production of 1.4 million MT of pig iron, 1.5 million MT of steel, and 1.3 million MT of rolled products. To increase production, open-hearth shop No. 3 was built, with two 185-MT furnaces; and a new blast furnace blower house with 4 Ehrhardt and Sehmer blowers was added, the only expansions to the plant undertaken at that time. An ore sintering plant was to be a part of the plan, but it was never constructed.

With the threat of the German advance into the Ukraine in World War II, the USSR performed a systematic removal of vital parts of installations and equipment to the Urals area, which left the mill almost completely inoperable. The Germans made some effort to operate the least damaged of the open-hearth furnaces, but without success. Further destruction was inflicted on Petrovski by the Germans upon retreat.

At the time of the Soviet reoccupation, it was estimated that 60 percent of the plant had been destroyed. Reconstruction began in 1944, and according to an authoritative source 2/ it was carried out entirely on the basis of former installations, with some modernization of auxiliary equipment. Capacities of individual machines were increased only where the condition of foundations made such improvements possible. In early 1945, several hundred German prisoners of war began to arrive to assist in the construction of the rail and structural mill, but when the last prisoner left in December 1949, the rolling mill was not yet in operation. Complete restoration of the Petrovski Metallurgical Plant was scheduled for early 1950, but it is not believed that the plant was in full operation until the end of the year. 3/

c. Raw Materials and Other Inputs.

Prewar. The plant operated on Krivoy Rog iron ore. When the Germans overran the area, large quantities of iron and steel scrap were available at the plant. It was estimated that the 300,000 to 500,000 MT of scrap would permit the plant to use a 30-percent scrap mixture in its blast furnaces for a considerable time. The consumption of fuel oil was low -- only 912 MT were used in 1940 -- since the fuel was used only for auxiliary firing of the rolling mills. Steel ingots from the open-hearth furnaces at the Dnepropetrovsk Pipe Mill were rolled at Petrovski and then returned to the pipe mill for finishing. Production of slabs at Petrovski was supplemented by incoming slab shipments of approximately 75,000 MT per year. Of this amount 25,000 MT came from Zaporozh'ye, 40,000 MT from Makeyevka, 10,000 MT from Kamenskoye (Dzerzhinsk), and small amounts from Kerch'. 4/

Postwar and Present. While most of the source material is concerned with the material bases during the postwar reconstruction period of the mill, it is believed that these sources remain the same for the present period of operation. The plant operates entirely upon Krivoy Rog iron ore, and uses only the best grade, low phosphorous iron ores for the production of Bessemer pig iron. 5/ Until the end of 1947, scrap metal came exclusively from stocks on hand and from Poland and East Germany. Shipments from Poland and Germany ceased in late 1949, and it is believed that scrap metal at the present time comes entirely from domestic collections. 6/ The yearly requirements for the open-hearth furnaces and the rolling mills amounted to 192 million cu m and 150 million cu m respectively. 7/ Manganese comes from the mines in the Nikopol' area of the Ukraine. 8/ Limestone is received from quarries in the Pyatikhatskiy region and from Yelenovskiy (also called Elenovka) in the Donbas. 9/ Cement used in the reconstruction of the plant was shipped in from Poland until 1947. From that time on, the product came from East Germany. 10/

d. Coal and Coke.

Coal. Since Petrovski Metallurgical Plant went into production, it has operated on coal shipped in from the Donets Basin. 11/ In 1941, coal was consumed at the rate of 30,300 MT per month, or approximately 364,000 MT per year. 12/

1941 Monthly Consumption of Coal

Plant Installation	Metric Tons
Boiler House	13,000
Open-Hearth Shops	5,700
Rolling Mills	5,000
Masonry Factory (Refractories?)	2,400
Cement Plant	600
Foundry	100
Railroad System	3,000
Miscellaneous Uses	500
Total	30,300

Coke. The steel plant is largely dependent upon the Dnepropetrovsk Coke-Chemical Plant imeni Kalinin for its supply of metallurgical coke, plus some additional shipments from plants in the Donets Basin. The Dnepropetrovsk Coke-Chemical Plant was destroyed during the war, but it is believed that it is again in operation. The steel plant and the coke plant are approximately 2 km apart. 13/

e. Ironmaking Facilities.

Prewar. Before World War II there were five blast furnaces in operation at Petrovski. Blast furnace No. 3 was dismantled in the 1920's. 14/

Blast Furnaces at Petrovski in 1941

Dimensions	No. 1	No. 2	No. 4	No. 5	No. 6
Hearth Diameter (MM)	4,700	5,650	6,000	6,000	5,550
Hearth Depth (MM)	3,300	3,300	3,300	3,300	3,300
Height of Bosh (MM)	3,300	3,300	3,300	3,300	3,300
Shaft Height (MM)	12,600	11,900	11,725	12,075	11,400
Shaft Diameter at Throat (MM)	3,850	4,900	4,900	5,000	5,000
Height to Lower Edge of Bell (MM)	21,520	22,900	23,000	25,350	23,000
Volume (Cu M)	420	600	643	688	625

Blast furnaces Nos. 1, 2, 5, and 6 had 4 stoves each, and blast furnace No. 4 had 6 stoves. 15/

Blast Furnace Burdens, September and October 1940

Kilograms of Material per Metric Ton of Pig Iron

		No. 1	No. 2	No. 4	No. 5	No. 6	Average
Metallurgical Coke	September	1,060	1,206	909	850	946	977
	October	1,145	1,003	950	871	1,023	982
Iron Ore	September	2,069	1,941	1,851	1,850	1,709	1,869
	October	2,083	1,889	2,003	1,933	1,947	1,970
Manganese							
Basic Pig		26	32	22	111	100	58
Bessemer Pig		26	131	21	103	21	60
Limestone	September	632	727	531	448	509	556
	October	744	542	614	459	725	603
Scrap	September	226	169	194	258	274	226
	October	140	215	128	207	163	172

The basic iron slag yield was 650 to 700 kg; the Bessemer iron slag yield was 700 to 750 kg per ton of pig produced. 16/

Daily Blast Furnace Production
During September and October 1940

Metric Tons

	No. 1	No. 2	No. 4	No. 5	No. 6	Total
Planned for 1940	420	650	650	700	620	3,040
Actual, September	415	420	710	640	630	2,823
October	440	570	695	690	570	2,965

Annual capacity of the blast furnaces was estimated at 900,000 MT. 17/

When the Germans took over the plant, the blast furnace structures were found to be intact, but the Russians had made a systematic removal from each furnace of important machinery, such as gears, motors, and other electrical equipment. No production was realized during the occupation, and further destruction took place on the withdrawal of the German Army from the area. 18/

Postwar Reconstruction. Restoration of blast furnaces began in 1944, and by late spring it was announced that 1 blast furnace (probably No. 5), with a volume of approximately 620 cu m and an annual rated capacity of 225,000 MT, was in operation, and 3 others were under construction. In October 1945, No. 4 blast furnace was blown in. In August 1947 it was announced that only 2 of the 5 prewar furnaces were in production, No. 4 and No. 5. Considerable progress was made in the following year, and in September 1948 it was announced that all five prewar furnaces were in full operation. One source 19/ claimed that No. 2 furnace was blown up by saboteurs in April 1949, and that by the end of December reconstruction was 75 percent complete. 20/

Improvements in Practices. Announcements in the Soviet press give some indication of the efficiency of the Petrovski blast furnaces. 21/ In March 1947 the coefficient of utilization of blast furnaces was reduced to 1.09 as compared to 1.19 in 1940. In August 1947, blast furnace No. 5 produced 1 MT of pig iron for each 0.94 cu m of volume as compared to a norm of 1.15 cu m, and No. 4 produced 1 MT of pig iron for each 0.95 cu m of volume. During the same month the blast furnaces as a group produced 1 MT of pig iron for each 1.12 cu m of volume, as compared to a norm of 1.14 cu m.

In September 1950, blast furnace No. 4 achieved a coefficient of 0.87 as compared to a norm of 0.96. In November 1952 it was announced that the blast furnace coefficient was 0.95 for January through November 1952.

At Present. It is believed that five blast furnaces are in operation at Petrovski, and that dimensions and capacities are essentially the same as they were before World War II. Some mechanization and modernization probably has taken place, but the extent of such improvements is not known.

1952 Pig Iron Production at Petrovski*

Blast Furnace Number	Volume (Cu M)	Coefficient	Operating Days	Production (Thousand MT)
1	420	0.95	340	150.3
2	600	0.95	340	214.7
4	643	0.95	340	230.1
5	688	0.95	340	246.0
6	625	0.95	340	223.6
Total Pig Iron Production				1,064.7

1953 Pig Iron Production at Petrovski*

Blast Furnace Number	Volume (Cu M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
1	420	0.93	340	153.4
2	600	0.93	340	219.3
4	643	0.93	340	235.0
5	688	0.93	340	251.5
6	625	0.93	340	228.5
Total Pig Iron Production				1,087.7

* See Appendix C, Methodology, for use of coefficient in estimating production.

f. Steelmaking Facilities.

Prewar. Before World War II there were 3 open-hearth shops, which housed 10 open-hearth furnaces, in the plant area.

Open-hearth Shop No. 1. This installation was built in 1901-02 and was adjacent to the Bessemer shop. It contained 4 50-ton furnaces.

Description of Furnaces in Open-hearth Shop No. 1

	No. 1	No. 2	No. 3	No. 4
Hearth Area (Sq M)	25.0	25.6	24.5	36.0
Charge per 24 Hours	2 to 2.5	2 to 2.5	2 to 2.5	2 to 2.5
Time Required per Charge (Hours)	10	10	10	10

In 1940, open-hearth shop No. 1 produced 500 MT of steel every 24 hours, 13,500 MT per month, and 160,000 MT per year. All furnaces were gas-fired, using 60 percent coke gas (4,100 calories), 20 percent blast furnace gas (1,000 to 1,100 calories), and 20 percent producer gas (approximately 1,350 calories). The shop was equipped with 2 70-ton cranes, with spans of 16.5 m. Six ingot molds were carried on each ingot buggy, and each ingot weighed 3.5 MT.

Open-hearth Shop No. 2. Shop No. 2, built in 1914, was located behind the plate mill, and interfered with the efficient operation of the plate mill, roughing mill, and roll-turning shop. There were 2 10- to 15-ton charging machines on the floor.

Description of Furnaces in Open-Hearth Shop No. 2

	No. 5	No. 6	No. 7	No. 8
Hearth Area (Sq M)	34.2	33.0	34.0	40.0
Capacity (MT)	50 to 55	50 to 55	60	100
Charges per 24 Hours	2 to 2.5	2 to 2.5	2 to 2.5	2 to 2.5
Time Required per Charge (Hours)	10	10	10	10

In 1940, open-hearth shop No. 2 produced 600 MT of raw steel every 24 hours, 15,000 MT per month, and 180,000 MT per year All furnaces were gas-fired and used 50 percent coke gas, 25 percent blast furnace gas, and 25 percent producer gas. Eighty percent of production was cast into 150-kg ingots, and the remainder was cast into 1.2- to 1.5-ton ingots for the plate mill.

Open-Hearth Shop No. 3. This installation contained two open-hearth furnaces. Furnace No. 9 was built in 1926 and No. 10 in 1930. Each furnace had a capacity of 150 MT, with an overcharge capacity of 200 MT.

Description of Furnaces on Open-Hearth Shop No. 3

	No. 9	No. 10
Hearth Area (Sq M)*	52	52
Charges per 24 Hours	1.5 to 2	1.5 to 2
Time Required per Charge (Hours)	10 to 12	10 to 12

In 1940, open-hearth shop No. 3 produced 650 MT of steel every 24 hours, 15,800 MT per month, and 190,000 MT per year. Both furnaces were gas-fired and used 50 percent coke gas, 20 percent blast furnace gas, and 30 percent producer gas. Two 120- to 175-ton ladle cranes had spans of 20 m. Steel was cast into 150-kg ingots.

Bessemer Shop. There were 3 9.8-cu m Bessemer converters in the shop, each with a capacity of 11 MT and an overcharge capacity of up to 15.8 MT.

Dimensions of Bessemer Converters

	Millimeters
Over-All Height	4,870
Inside Diameter	2,560
Inside Height	3,240

* According to Soviet official statistics, hearth area was 48 sq m for each furnace.

Under normal conditions the ratio of converter volume to converter content was 1.2 to 1.5 cu m per ton of charge. A 600-ton mixer and a 125-ton crane were in the shop. All three converters had hydraulic tipping devices. Rail steel was the primary product of the Bessemer shop. In 1940 the plant produced 925 MT of steel per day, 26,500 MT per month, and 317,445 MT per year.

Summary of Steel Mill Production in 1941

	Metric Tons		
	Daily	Monthly	Yearly
Open-Hearth Shop No. 1	500	13,500	160,000
Open-Hearth Shop No. 2	600	15,000	180,000
Open-Hearth Shop No. 3	650	16,000	200,000
Bessemer Shop	1,200	31,000	370,000
Total	2,950	75,500	910,000

On the approach of the German Army, the Russians made some effort to deny the use of steelmaking facilities of Petrovski to the Germans. Open-hearth shop No. 1, with four furnaces, was left in fair condition, however. In the No. 2 shop, water was cut off in all four furnaces during operation, parts of the cranes were cut by acetylene torches, and all motors were removed; and in the No. 3 shop, all electrical equipment and motors were removed and the cranes were collapsed. As far as is known the Germans made no effort to put the plant into operation, and upon retreat they inflicted additional damage, such as collapsing the columns in several of the furnaces. 22/

Postwar Reconstruction. Restoration of steelmaking facilities began in November 1943 with the rebuilding of open-hearth shop No. 1. By July 1944, open-hearth Nos. 1 through 4 had been reconstructed and were in operation. In 1946 it was announced that open-hearth shop No. 2 would not be rebuilt. This shop had suffered particularly heavy damage during the war, had never been properly mechanized, and was located in the center of the plant area where it had always interefered with the efficient operation of the plant's transportation system and the operation and development of the rolling mills. Open-hearth shop No. 3 was reconstructed, and by April 1947, open-hearth No. 10 was in production, followed in June 1948 by the firing of No. 9. Some improvements in the construction of open-hearth furnaces were undertaken in June 1950, when it was announced that all 4 furnaces in Open-hearth Shop No. 1 were being refitted with chrome-magnesite roofs which would permit high speed smelting.

The 3 11-ton Bessemer converters were being rebuilt in 1948, and all were in operation in December 1949. 23/

Improvements in Practices. The following press items are concerned with the operation of the steelmaking facilities at Petrovski: To increase the quality of Bessemer steel, an improved method of deoxidizing rail steel, with the addition of aluminum at the rate of 0.8 to 1.0 kg per ton, was adopted at Petrovski in mid-1947. 24/ In February 1949, workers achieved a smelting in 5 hours and 20 minutes, and produced 9.46 MT of steel for each sq m of hearth area instead of the progressive norm of 4.85 MT. 25/ In September 1949, open-hearth shop No. 1 was the first in the Dnepr Basin to complete 5 smeltings in 1 24-hour period. From each square meter of hearth area 9.5 MT of steel were realized, as compared to the working norm of 4.5 MT. 26/ In the spring of 1950, open-hearth shop No. 1, with a norm of 5.2 MT of steel per square meter of hearth area, obtained 8.4 MT of steel. 27/ The average output of steel in June 1950 was 6.3 MT, instead of the norm of 6 MT per square meter of hearth area. 28/ In July 1950 the average output of open-hearth furnace No. 3 was 8.8 MT of steel for each square meter of hearth area. 29/ In April 1951, open-hearth shop No. 1 was producing an average of 6.17 MT of steel per square meter of hearth area, as compared to the 1940 output of 3.65 MT. 30/ In July 1951, open-hearth shop No. 3 was producing an average of 6.17 MT of steel per square meter of hearth area, as compared to the progressive norm of 6.1 MT. 31/

At Present. Six open-hearth furnaces -- 3 with an approximate capacity of 40 MT, 1 with 30 MT, and 2 with 100 MT -- and 3 Bessemers are in operation at Petrovski.

Estimated 1952 Open-Hearth Steel Production at Petrovski*

Open Hearth Number	Hearth Area (Sq M)	Coefficient	Operating Days	Production (Thousand MT)
Open Hearth Shop No. 1				
1	25.0	5.2	325	43.3
2	25.6	5.2	325	43.3
3	24.5	5.2	325	41.4
4	36.0	5.2	325	60.8
Open Hearth Shop No. 3				
9	52.0	6.1	325	103.1
10	52.0	6.1	325	103.1
Total Open-Hearth Steel Production				394.0

Estimated 1952 Bessemer Steel Production at Petrovski*

Bessemer Number	Capacity (MT)	Number Heats per Day	Operating Days	Production (Thousand MT)
1	0.011	25	300	82.5
1	0.011	25	300	82.5
1	0.011	25	300	82.5
Total Bessemer Steel Production				247.5
Grand Total, Steel Production				641.5

* See Appendix C, Methodology, for use of coefficient in estimating production.

Estimated 1953 Open-Hearth Steel Production at Petrovski*

Open Hearth Number	Hearth Area (Sq M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
Open-Hearth Shop No. 1				
1	25.0	5.4	325	43.9
2	25.6	5.4	325	44.9
3	24.5	5.4	325	43.0
4	36.0	5.4	325	63.2
Open-Hearth Shop No. 3				
9	52.0	6.3	325	106.5
10	52.0	6.3	325	106.5
Total Open-Hearth Steel Production				408.0

Estimated 1953 Bessemer Steel Production at Petrovski*

Bessemer Number	Capacity (MT)	Number Heats per Day	Operating Days	Production (Thousand MT)
1	0.011	25	300	82.5
1	0.011	25	300	82.5
1	0.011	25	300	82.5
Total Bessemer Steel Production				247.5
Grand Total, Steel Production				655.5

* See Appendix C, Methodology, for use of coefficient in estimating production.

g. Primary Rolling Facilities.

Prewar. In 1940, steel production at Petrovski was supplemented by shipments of steel for processing from Zaporozh'ye, Makeyevka, and Kamenskoye (now called Dneprodzerzhinsk).

Primary rolling mills at Petrovski included 5 soaking pits, a 980- to 1,000-mm blooming mill, and 2 roughing mills, 1 of which was a 640-mm mill. The roughing mills had an annual capacity of 200,000 MT.

When the Germans captured the Petrovski Metallurgical Plant, transfer and runout tables were intact, but gears and motors were missing, pinion housings had been removed, and other equipment essential to the operation of the mills was lacking. The Germans were unable to operate the mills during occupation, and upon their retreat further destruction took place. 32/

Reconstruction Period. Restoration of primary rolling mills began with the reoccupation of the area by the Soviet Army. By December 1946 the blooming mill and 1 (possibly 2) roughing mills were back in operation. In the same month it was announced that a new blooming mill with new soaking pits was being built, with foundations constructed by the Stalino plant of Novo-Kramatorsk and the main electric-drive motor built by the Electrosil plant of Leningrad. There is no information to indicate that the new blooming mill was ever completed. 33/

At Present. One blooming mill -- and possibly a second, new blooming mill -- and one roughing mill are in operation at Petrovski. A second roughing mill was replaced by a rail and structural mill. See Finishing Rolling Facilities, below.

h. Finishing Rolling Facilities.

Prewar. In 1940 the following finishing mills were in operation at Petrovski:

Type of Rolling Mill	Diameter of Rolls (MM)	Yearly Capacity (MT)
Sheet Mill for 1- to 4 mm-Sheet		
Plate Mill for 8-to 32-mm Plate	900/700/900	70,000
Bar Mill	500	70,000
Bar Mill	420	70,000 to 80,000
Strip Mill	330	90,000
Strip Mill	260	70,000
Wire Mill	240/300	80,000

When the Germans captured Petrovski, finishing facilities were found inoperable, because of the removal of essential machinery and equipment by the USSR. 34/

Reconstruction Period. Restoration of finishing mills began shortly after the USSR recaptured the Ukraine. On 23 October 1944 the thin sheet mill was placed in operation, and in 1947 the wire mill started production.

Large numbers of prisoners of war were brought into the plant in 1946 to work on the construction of a new rail and structural mill, which was a replacement for the second roughing mill in the primary rolling mill shop. The second roughing mill was completely destroyed during the war. The last prisoners of war were repatriated in December 1949, at which time the housing for the rail and structural mill was complete and most of the equipment and machinery were in place, but the mill was not yet in operation. 35/

By the end of 1949 the following rolling mills were in operation:

An 800/650/800-mm 3-high plate mill. 200 to 300 MT were rolled each 8-hour shift.

A 700/500/700-mm 3-high medium sheet mill. 50 to 60 MT were rolled each 8-hour shift.

A 600/800 2-high thin sheet mill. It was estimated that 150,000 MT were produced in this mill in 1949.

A structural mill, which consisted of 3, 3-high stands, the first of which was a roughing stand, and 2 finishing stands.

This mill was fed by a double row of continuous heating furnaces which were coal-fired. Yearly output in 1949 was estimated at 60,000 to 80,000 MT.

A medium structural mill, which was a 500-mm mill fed by a 640-mm roughing mill. The finishing line had 3, 3-high stands. 1949 production was estimated at 50,000 to 60,000 MT.

A small shape mill, which consisted of a 250-mm bar mill, which was serviced by hand from the front and rear.

A 320-mm wire rod mill, which rolled rounds 17 to 22 mm in diameter and squares over 20 mm, and wire rod.

A wire mill. No further information is available.

Forge and press shop. 36/

At Present. Finishing facilities at Petrovskiare believed to be the same as those described above.

i. Intraplant Services.

Electric Power. In 1940 the electric power station at Petrovski contained 4 steam-turbo generators, 2 of which were 10,000 kw, installed in 1927 and 1930; 1 of which was 6,000 kw and built in 1913; and the fourth was 4,000 kw and was installed in 1909. Power was 3,150-v AC, but the No. 2 generator could be switched to 6,300 v. The station had a total installed capacity of 30,000 kw. Actual power plant capacity amounted to 27,000 to 28,000 kw in the summer months when the water level was low. When the water level was high, more power could be drawn from the Dnepr power network.

In 1940 the average monthly power consumption was 12,915,000 kwh, which was distributed in the plant as follows:

Installation	Kwh
Rolling Mills	3,850,000
Blast Furnaces	300,000
Waterworks	2,200,000
Gas Purification	1,200,000
Cement Plant	1,050,000
Open-Hearth Shops	700,000
Machine Shop	60,000
Foundries	120,000
Special Shop	100,000
Masonry Factory	200,000
Boilerhouse	85,000
Scrap Crusher	100,000
Use of Power Plant	600,000
Plant Railroad System	300,000
Miscellaneous	1,800,000
Losses	250,000
Total	12,915,000

Considerable damage was inflicted on the power station by the USSR just before the time of the German capture of the plant. Only the No. 2 generator was left intact; the others were completely out of use. In January 1945, one of the 10,000-kw generators was back in commission, and by early 1949 the power station was completely restored. 37/

Water Supply. In 1940 there were 2 pumping stations operating on the Dnepr River, a central repumping station in the plant area was working, and 2 pumping stations were serving the blast furnaces. When the steel mill was in full operation, water consumption amounted to 47,000 cu m per 24 hours. Drinking water came from the Dnepropetrovsk city water main. All pumping stations were back in operation in early 1949. 38/

Steam Power. In 1940, three boilerhouses were in operation at Petrovski. Boiler House No. 1, which was located near the electric power station, contained 17 boilers. Nos. 1 to 13 were fired by either coal or blast furnace gas, and Nos. 14 to 17 operated on blast furnace gas only. The USSR removed motors and electrical equipment from 9 of the boilers and left 8 in operating condition. Boiler House No. 2, which was located near the blast furnace blower house, had 4 modern Ehrhardt and Shemer gas piston blowers. It had four boilers equipped to use waste heat on the same steam circuit which led to the powerplant, and therefore they were used also for power production. These were blown up by the USSR. Boiler House No. 3 was part of the cement plant, and the four boilers were used by the cement plant for drying purposes. The steam was used for heat. Steam Accumulator No. 1 was located near the blast furnace plant. Another steam accumulator, No. 2, was housed in the sheet mill. It is believed that reconstruction was completed by mid-1949. 39/

Other Intraplant Service Units. In addition to the above, the following were in operation in early 1949:

Refractory and slag plant,
Machine shop,
Construction and repair shop,
Molding shop, and
Welding shop. 40/

j. Products and Production.

Products. Production, before World War II and at the present time, includes the following: pig iron, open-hearth steel, Bessemer steel, blooms and slabs, bars, sheet, plate, structurals, rails, and wire. 41/

Production.

Annual Production at Petrovski

Thousand Metric Tons

Product	1933	1936	1937	1938	1939	1940	1947	1952	1953
Pig Iron			930.0 43/	less than 800.0 43/	less than 800.0 43/	820.0 43/	887.0 42/	1,064.7 42/	1,087.7 42/
Open-Hearth Steel	310.0 44/	525.0	562.0 44/	537.0 44/				394.0 42/	408.0 42/
Bessemer Steel				326.0 43/	309.0 43/	317 43/		247.5 42/	247.5 42/
Finished Steel	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	460.0 42/	472.0 42/

k. Distribution.

In 1947, Petrovski was rolling sheet metal for the Khar'kov and Kramatorsk machine building plants. 45/ In May 1950 the Yuzhno-Trubnyy Pipe Works at Nikopol' was receiving billets from Petrovski and was claiming that Petrovski had been behind in deliveries since 1949. 46/ In February 1951 the rolling mills at Petrovski had fulfilled the February order for angle iron for the Tsimlyansky hydroelectric power aggregate. 47/ The plant was also shipping sheet metal to the Volga-Don Canal project. 48/ In November 1951, Petrovski was shipping ingots to the Dnepropetrovsk Steel Fabricating Plant imeni Molotov, pig iron and bar mill rounds to the Dnepropetrovsk Pipe Rolling Mill imeni Lenin, and to the Rostov Agricultural Machine Plant. 49/

l. Plant Efficiency.

In June 1947 it was announced that for a long time the plant had been failing in the quality and quantity of its products. Targets were missed by thousands of tons in the production of pig iron, steel, and rolled products; the output of defective goods was great; and manufacturing costs were too high. The primary cause of the failure was poor management, which resulted in the improper use of equipment, great losses in working time, and delay in the delivery of raw materials. 50/

In June 1948 it was announced that Petrovski was producing pig iron cheaper than any other enterprise in the Southern Region, and had achieved savings of 31,000 MT of iron ore, 55,000 MT of manganese, 16,000 MT of limestone, and 13,000 MT of coke during a 5-month period. 51/

m. Administration.

The plant is under the administration of the Ministry of Ferrous Metallurgy. 52/

n. Personnel.

Number of Employees. Estimates of the number of employees at Petrovsk vary between 18,000 and 25,000. The plant works three shifts per day. 53/

Administrative Personnel. Director of the plant in January 1947 was T. Savochkin. 54/

Director of the plant in January 1947, and mentioned again in July 1948 and in December 1952, was Ilya I. Korobov. 55/

In early 1949 the Chief Engineer was (fnu) Filipov, the Chief of Blast Furnace Department was (fnu) Zhdanovsky, the Chief of open-hearth shop No. 1 was (fnu) Novikov, the Chief of the Sheet Rolling Mill was (fnu) Malyy. 56/

In February 1950 (fnu) Sochan was mentioned as the Chief of the Open-hearth Department. 57/

o. Locational Characteristics.

The plant area is surrounded by a 2.5-m stone wall, capped with 3 strands of barbed wire. There are a number of wooden watch towers, and the plant militia is armed with carbines and pistols. 58/

40. Spartak Metal Goods Factory (Dnepropetrovsk Rolling Mill; Spartacus). [redacted] 25X1A2g

a. Location.

48° 27'N - 34° 59'E. Dnepropetrovsk, Dnepropetrovsk Oblast, Ukraine SSR. The plant lies along the Stalino railroad line. 1/

b. History and Development.

The plant was established in 1902, and it had been enlarged and improved in the years before World War II. Some damage was sustained during the war, but the extent is not known. 2/

c. Raw Materials and Other Inputs.

In 1941, steel ingots were shipped into the plant from steel mills located in southern Russia. 3/

d. Coal and Coke.

No information available.

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

None.

g. Primary Rolling Facilities.

In 1941 the plant had a single stand, 2-high, 550-mm breakdown mill. 4/

h. Finishing Rolling Facilities.

In 1941 a plate and sheet mill was in operation which consisted of a single stand, 3-high, 500/375/500-mm mill. 5/

i. Intraplant Services.

No information available.

j. Products and Production.

Before World War II, Spartak was rolling sheet steel for domestic appliances, shovels, bicycle plate, ploughshares, fish-plate, agricultural machinery, and buckets. 6/ In August 1949 it was announced that the plant would produce 5 million shovels per year. 7/

k. Distribution.

In March 1951 it was announced that Spartak had sent a large order of spades to Kakhovka. 8/

l. Plant Efficiency.

No information available.

m. Administration.

The direction of the plant in the yeass before World War II is not clear. One source, 9/ claimed that it was under the Chief Directorate of the Metal Products Industry (Glavmetiz), and another source, 10/ claimed that the plant belonged to the Dnepromet Trust, which was subordinate to the People's Commissariat of Heavy Industry. The plant at the present time may be under the Ministry of Light Industry.

n. Personnel.

In 1937 the plant employed 2,000 persons. 11/

o. Locational Characteristics.

No information available.

B. Dneprodzerzhinsk Complex.

41. Dneprodzerzhinsk Coke-Chemical Plant imeni Kamen.

[redacted] 25X1A2g

a. Location.

48° 28'N - 34° 33'E. Dneprodzerzhinsk, Dnepropetrovsk Oblast, Ukraine SSR. The plant site is approximately 5 km southeast of the Kamenskoye Thermal Power Station and 1 km southeast of the Bagley railroad station. 1/

b. History and Development.

In June 1943 a coke-chemical plant appeared to be under construction, but in June 1944 all signs of construction were absent in an aerial photograph. 2/

c. Raw Materials and Other Inputs.

No information available.

d. Coal and Coke.

Coal. No information available.

Coke. No coke-chemical facilities are believed to be in operation. 3/ One source, 4/ however, estimated in 1952 that a plant was in operation with the following capacities:

Number of Batteries	2
Number of Coke Ovens	94
Normal Coking Time (Hours)	16
Coal Charge per Oven, Dry Basis (MT)	15
Total Daily Carbonization Capacity (MT)	2,115
Annual Carbonization Capacity (MT)	761,400
Annual Coke Capacity, Dry Basis (MT)	578,664
Annual Coke Capacity, Moist Basis (MT)	600,000
Refined Benzene Capacity (MT per Year)	4,860
Refined Toluene Capacity (MT per Year)	1,140
Crude Tar Capacity (MT per Year)	22,530
Ammonium Sulfate Capacity (MT per Year)	7,974

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

None

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

None.

i. Intraplant Services.

No information available.

j. Products and Production.

No information available.

k. Distribution.

No information available.

l. Plant Efficiency.

No information available.

m. Administration.

No information available.

n. Personnel.

No information available.

o. Locational Characteristics.

No information available.

42. Dneprodzerzhinsk Coke-Chemical Plant No. 24 imeni Ordzhonikidze. [redacted] 25X1A2g

a. Location.

48° 32'N - 34° 39'E. Dneprodzerzhinsk, Dnepropetrovsk Oblast, Ukraine SSR. The plant is located in the northwest section of Dneprodzerzhinsk on the south bank of the Dnepr River. 1/

b. History and Development.

The coke plant, consisting of 215 Becker-type ovens, was built in 1930-31 and had a capacity of 1,300,000 MT of metallurgical coke. Reconstruction of installations damaged during World War II began late in 1944, and it is estimated that all four coke batteries were back in operation by the end of 1948. 2/

c. Raw Materials and Other Inputs.

No information available.

d. Coal and Coke.

Coal. Coal is received from mines in the Donets Basin. 3/

Coke. Four batteries of 215 Becker-type coke ovens were in operation at Dneprodzerzhinsk Coke-Chemical Plant before World War II. All suffered some damage during the war years. The following announcements in the Soviet press concern the reconstruction of facilities. In January 1945 one coke battery went into operation. On 31 October 1945 the No. 2 battery was restored. Another coke battery went back into production in August 1946. In May 1947 the No. 1 battery was restored. 4/

The following estimate of the capacities of the Dneprodzerzhinsk Coke-Chemical Plant was made in 1952:

Number and Type of Batteries	4 Becker
Number of Coke Ovens	215
Volume of Oven (Cu M)	20.8
Width of Oven (MM)	406
Normal Coking Time (Hours)	16.0
Coal Charge per Oven, Dry Basis (MT)	15.5
Total Daily Carbonization Capacity (MT)	5,000
Annual Carbonization Capacity (MT)	1,800,000
Annual Coke Capacity, Dry Basis (MT)	1,368,000
Annual Coke Capacity, Moist Basis (MT)	1,400,000
Refined Benzene Capacity (MT per Year)	11,340
Refined Toluene Capacity (MT per Year)	2,660
Crude Tar Capacity (MT per Year)	52,570
Ammonium Sulfate Capacity (MT per Year)	18,606 5/

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

None.

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

None.

i. Intraplant Services.

No information available.

j. Products and Production.

Metallurgical coke, refined benzene, refined toluene, crude tar, and ammonium sulfate are produced at the plant. 1952 and 1953 coke production is estimated at 1,400,000 MT. 6/

k. Distribution.

Metallurgical coke is shipped to the Dzerzhinskii Steel Plant. 7/

l. Plant Efficiency.

The coke plant completed the plan for the first half of 1950 on 26 June 1950. 8/ Yield of charged coal to metallurgical coke was 77.7 percent in 1952.

m. Administration.

The plant probably operates under the direction of the Ministry of the Chemical Industry. 9/

n. Personnel.

No information available.

o. Locational Characteristics.

No information available.

43. Dneprodzerzhinsk Metallurgical Plant imeni Dzerzhinski (Kamenskoye Metallurgical Plant; Dneprovski Metallurgical Plant). [redacted] 25X1A2g

a. Location.

48° 31'30"N - 34° 37'30"E. Dneprodzerzhinsk, Dnepropetrovsk Oblast, Ukraine SSR. The plant is on the west bank of the Dnepr River, just north of the town of Dneprodzerzhinsk. There is a good highway connection to the town of Dneprodzerzhinsk. 1/

b. History and Development.

Dneprodzerzhinsk Metallurgical Plant was established in 1887 on the banks of the Dnepr River because of the accessibility of the site by water to the coal mines of the Donets Basin and the iron ore in the Krivoy Rog area. Up to the time of the Russian Revolution the plant was under the direction of the South Russian Dnepro Metallurgical Company and was known as the Dneprovski Metallurgical Plant. Installations included 5 blast furnaces, 10 open-hearth furnaces, 3 Bessemer converters, and rolling mills for the production of rails, plate, sheet, and wire. The plant was inoperative from 1919 until 1924, when the first blast furnace was fired under the direction of the Soviet government. In 1926 the mill embarked upon a period of reconstruction and expansion. Blast furnaces were equipped with blowers and automatic charging apparatus. Under the Second Five Year Plan (1933-37) there was another expansion, which was planned to bring the plant up to a rolled products capacity of 1 million MT per year. During World War II, Dneprodzerzhinsk was occupied by the Germans for 2 years, during which time considerable destruction took place. Restoration and reconstruction began in October 1943, shortly after the Russians recaptured the area. In March 1946 it was announced that 820 million rubles would be invested in the expansion of the mill during the next 5 years. 2/

c. Raw Materials and Other Inputs.

Prewar. Iron ore was shipped into the plant from Krivoy Rog. Quartzite was shipped in by rail from the Ore Mine Administration, Stalino. 3/ Kerosene came in tank cars from Rostov Petroleum Supply. Fuel oil was shipped in by rail from Grozny Petroleum Supply.

Reconstruction Period and At Present. Iron ore is being received from Krivoy Rog. One source claimed that shipments amounted to 600 MT per day in 1946. In 1946, scrap was shipped in by rail from East Germany. Anthracite coal for the operation of the electric power plant was received from Upper Silesia, Poland, in 1946, and was consumed at the rate of 600 MT per day. Steel slabs in July 1951 were being shipped into the plant from Azovstal and Novo-Tagil steel plants. 4/

d. Coal and Coke.

Coal for use at Dneprodzerzhinsk has always been received by rail from the Donets Basin. Coke has always been procured at the nearby Dneprodzerzhinsk Coke-Chemical Plant imeni Ordzhonikidze. 5/

e. Ironmaking Facilities.

Prewar. In 1941 there were seven blast furnaces in operation at Dneprodzerzhinsk:

Blast Furnace Number	Capacity (Cu M)
1	428
2	424
3	585
5	428
6	556
7	930 (Placed in Operation in 1932)
8	930 (Placed in Operation in 1937)

In 1935, blast furnace No. 7 had an average daily production of 743 MT, and in 1936 the average daily production rose to 903 MT. 6/

Reconstruction Period. The following items appeared regarding the restoration of blast furnaces at Dneprodzerzhinsk: In July 1945, blast furnace Nos. 1, 3, 4, and 6 had been restored. 7/ Note that blast furnace No. 4 was never mentioned in the prewar description of facilities in existence. It is believed that blast furnace No. 4 is a misprint. In January

1946 it was announced that three blast furnaces were functioning at the plant. 8/ In March 1946 it was stated that during the Five Year Plan the blast furnace shop would have blast furnaces Nos. 9 and 10 modernized, and that it would receive 4 large new furnaces. It was stated also that blast furnaces Nos. 9 and 10, plus 2 old furnaces, made up the installations of the shop, which eventually would have 14 blast furnaces. 9/ In May 1946 it was announced that another blast furnace would be added during the year. 10/ In June 1946 the restoration of blast furnace No. 7 was completed, with the same capacity that it had before World War II -- 930 cu m. 11/ In November 1946 it was announced that blast furnace Nos. 3 and 5, which were of obsolete design and which had been damaged by the Germans, would be replaced by a large new furnace. 12/ At approximately the same time, blast furnace No. 1 was completed and was producing ferrosilicon and a special pig iron* which was used for the deoxidization of open-hearth steel. 13/ In September 1948, blast furnace No. 8, which had been destroyed by the Germans, was commissioned. 14/ The same month it was reported that seven blast furnaces were in operation at Dneprodzerzhinsk. 15/

Improvements in Practices. Blast furnace coefficients have been announced for the following dates:

Date	Coefficient
1940	1.12
1948	0.91
1949	0.88
January through June 1950	0.84
January through October 1952	0.83
October and November 1952	0.80 16/

At Present. It is believed that the replacement for blast furnaces Nos. 3 and 5 is now completed and in production.

* Probably spiegeleisen.

Estimated 1952 Production of Pig Iron at Dneprodzerzhinsk*

Blast Furnace Number	Volume (Cu M)	Coefficient	Operating Days	Production (Thousand MT)
1	428	0.83	340	175.3
2	424	0.83	340	173.7
-	930	0.83	340	380.9
6	556	0.83	340	227.7
7	930	0.83	340	380.9
8	930	0.83	340	380.9
9	930	0.83	340	380.9
10	903	0.83	340	380.9
Total Pig Iron Production				2,481.2

Estimated 1953 Production of Pig Iron at Dneprodzerzhinsk*

Blast Furnace Number	Volume (Cu M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
1	428	0.80	340	181.9
2	424	0.80	340	180.2
-	930	0.80	340	395.3
6	556	0.80	340	236.3
7	930	0.80	340	395.3
8	930	0.80	340	395.3
9	930	0.80	340	395.3
10	930	0.80	340	395.3
Total Pig Iron Production				2,574.9

Sintering Facilities. Two sintering plants are in operation. One of these was built in 1935, and the other was part of the postwar expansion program. It was placed in operation in mid-1947. 17/

* See Appendix C, Methodology, for use of coefficient in estimating production.

f. Steelmaking Facilities.

Prewar. In 1941 the following open-hearth furnaces, 7 with capacities of approximately 50 to 60 MT, 1 with 80 MT, and 7 from 125 to 150 MT, were in operation at the plant:

Open Hearth No.	Hearth Area (Sq M)	Date of Completion
Open Hearth Shop No. 1		
1	25.3	Before 1933
2	26.0	Before 1933
3	26.1	Before 1933
4	28.2	Before 1933
5	29.75	Before 1933
6	34.0	Before 1933
Open Hearth Shop No. 2		
7	36.0	Before 1933
8	38.5	
9	53.7	
10	54.0	
Open Hearth Shop No. 3		
11	50.74	1933
12	50.74	1933
13	50.74	1933
14	50.74	1933
15	67.0	1940

In addition to the open-hearth furnaces there were 3 Bessemer converters, each of which had a capacity of 16 MT. 18/

Reconstruction Period. The following items pertain to the reconstruction of open-hearths and Bessemer converters in the postwar period: By the end of 1945, 6 open-hearth furnaces had been restored and were in operation. In this number were included open hearths Nos. 7 and 9. 19/ In March 1946 it was announced that during the Fourth Five Year Plan 5 open hearths would be restored, another 9 furnaces would be built, and another Bessemer converter would be constructed. It was the ultimate plan to have a total of 21 open-hearth furnaces in operation at the Dneprodzerzhinsk Metallurgical Plant. 20/ It was announced in May 1946 that one open-hearth was to be placed in operation before the end of the year. 21/ In September 1947 it was announced that the Bessemer plant had been re-established and that the 3 furnaces had a total capacity of 30 percent above that of the prewar establisment.* 22/ In September 1948, 1 source claimed there were 14 open-hearth furnaces in operation at Dneprodzerzhinsk, of which 4 furnaces had a capacity of 30 MT each, 6 furnaces had a capacity of 100 MT each, and 4 furnaces had a capacity of 125 MT each. 23/ At the end of 1950 a source claimed that 2 open-hearth shops were in operation, 1 of which contained 6 furnaces with an average hearth area of 20 sq m, and the other contained 4 open-hearth furnaces with an average hearth area of 37 sq m. 24/ In April 1951 it was claimed that 12 open-hearth furnaces, with an annual capacity of 800,000 MT of steel, were in operation. 25/

Improvements in Practices. Several sources reported the following output of steel for each square meter of hearth area:

Yield of Steel in Proportion to Hearth Area 26/

Metric Tons per Square Meter

	1935	1940	1946	1948	1949	1950 (Jan to Jun)	1950	1951 Plan
All Furnaces	2.8	3.31	3.65	3.29	6.2	6.32		
Open-Hearth Shop No. 1							4.2	4.5
Open-Hearth Shop No. 2							6.8	7.2
Open-Hearth Shop No. 3	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

* If this statement is true, the capacity of the Bessemer converters was increased to over 20 MT each.

At Present. Fifteen open-hearth furnaces, 7 with capacities of approximately 50 to 60 MT, 1 with 80 MT, and 7 with 125 to 150 MT, and 3 Bessemer converters are producing steel at Dneprodzerzhinsk:

Estimated 1952 Open-Hearth Steel Production at Dneprodzerzhinsk*

Open Hearth No.	Hearth Area (Sq M)	Coefficient	Operating Days	Production (Thousand MT)
Open-Hearth Shop No. 1				
1	25.3	6.32	325	51.9
2	26.0	6.32	325	53.4
3	26.1	6.32	325	53.6
4	28.2	6.32	325	57.9
5	29.75	6.32	325	61.4
6	34.0	6.32	325	69.8
Open-Hearth Shop No. 2				
7	36.0	6.32	325	73.9
8	38.5	6.32	325	79.1
9	53.7	6.32	325	110.2
10	54.0	6.32	325	110.9
Open-Hearth Shop No. 3				
11	50.74	6.32	325	104.2
12	50.74	6.32	325	104.2
13	50.74	6.32	325	104.2
14	50.74	6.32	325	104.2
15	67.0	6.32	325	137.6
Total Open-Hearth Steel Production				1,276.5

* See Appendix C, Methodology, for use of coefficient in estimating production.

Estimated 1952 Bessemer Steel Production at Dneprodzerzhinsk*

Bessemer No.	Capacity (MT)	Heats per Day	Operating Days	Production (Thousand MT)
1	20	25	300	150.0
1	20	25	300	150.0
1	20	25	300	150.0
Total Bessemer Steel Production				450.0
Estimated Total Steel Production, 1952				1,726.5

Estimated 1953 Open-Hearth Steel Production at Dneprodzerzhinsk*

Open Hearth Number	Hearth Area (Sq M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
Open-Hearth Shop No. 1				
1	25.3	6.5	325	53.4
2	26.0	6.5	325	54.9
3	26.1	6.5	325	55.1
4	28.2	6.5	325	59.6
5	29.75	6.5	325	63.2
6	34.0	6.5	325	71.8
Open-Hearth Shop No. 2				
7	36.0	6.5	325	76.0
8	38.5	6.5	325	81.3
9	53.7	6.5	325	113.4
10	54.0	6.5	325	114.0

* See Appendix C, Methodology, for use of coefficient in estimating production.

Estimated 1953 Open-Hearth Steel Production at Dneprodzerzhinsk (Continued)

Open Hearth Number	Hearth Area (Sq M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
Open-Hearth Shop No. 3				
11	50.74	6.5	325	107.2
12	50.74	6.5	325	107.2
13	50.74	6.5	325	107.2
14	50.74	6.5	324	107.2
15	67.0	6.5	325	141.5
Total Open-Hearth Steel Production				1,313.0

Estimated 1953 Bessemer Steel Production

Bessemer No.	Capacity (MT)	Heats per Day	Operating Days	Production (Thousand MT)
1	20	25	300	150.0
1	20	25	300	150.0
1	20	25	300	150.0
Total Bessemer Steel Production				450.0
Estimated Total Steel Production, 1953				1,763.0

g. Primary Rolling Facilities.

Prewar. The following primary rolling mills were in operation at Dneprodzerzhinsk Metallurgical Plant before World War II:

One "old" blooming mill, one stand, 1,100-mm, driven by a 6,000-hp steam engine. The mill produced 524,600 MT in 1940.

One "new" blooming mill, one stand, 1,150-mm, driven by a 7,000-hp motor. The mill had 4 soaking pits, each with a capacity for 6 5-ton or 4 7-ton ingots. The mill produced 1,071,450 MT in 1940.

One universal mill, 2-high, 780/600-mm, driven by a 4,000-hp motor, with a speed of 120 rpm. It produced 243,000 MT in 1940. 27/

Reconstruction Period. In February 1947 it was announced that the "new" blooming mill would soon be starting to work. 28/

At Present. It is probable that both blooming mills and the universal mill are in operation, with an estimated annual capacity of 1.6 million MT.

h. Finishing Rolling Facilities.

Prewar. The following finishing facilities were in operation before World War II:

One medium bar mill, 3-high, consisting of 1 roughing stand, 640 mm, driven by a 540-hp motor, 60 rpm; and 3 finishing stands, 500 mm, driven by a 1,000-hp motor, 120 to 180 rpm. 1940 production was 108,000 MT.

No. 1 small bar mill, consisting of 1 3-high, 550-mm roughing stand, driven by a 600-hp motor; one 450-mm, 2-high friction roll intermediate stand, driven by a 1,000-hp motor; and 6 2-high, 330-mm finishing stands, driven by a 750-hp motor. Production in 1940 was 76,000 MT.

No. 2 small bar mill, consisting of 1 3-high, 550-mm, roughing stand, driven by a 600-hp motor (also powered roughing stand of No. 1 small bar mill); 2 3-high, 450-mm intermediate stands, driven by a 1,000-hp motor; and 7 2-high, 380-mm finishing stands, driven by a 750-hp motor. Annual production was 95,000 MT in 1940.

One heavy plate mill, 3-high, three stands, 860/630/830-mm, length of roll 800 mm. Built by Lauta. Driven by a 900-hp and a 500-hp motor on a single shaft, 52 rpm. 1940 production was 56,000 MT.

One medium plate mill, consisting of 1 stand, 3-high, 650/500/650-mm, length of roll 1,800 mm; and 1 stand, 2-high, 660-mm, length of roll 1,600-mm. Built by Lauta. Driven by a 500-hp motor, 73 rpm. Production in 1940 was 41,000 MT.

One sheet mill, 2-high, 630 mm. Length of roll 1,500 mm. Driven by a 500-hp motor, 49 rpm. 1940 production was 13,000 MT.

One rail and structural mill, 2-high, 860-mm, reversible, consisting of 3 structural stands and 2 rail stands. Driven by a 9,000-hp steam engine. 1940 production was 340,000 MT.

One wire rod mill, consisting of 3 roughing stands, 500 mm, driven by a 1,000-hp engine, 85 to 125 rpm; 6 or 7 intermediate stands, 330/300 mm, driven by a 1,200-hp engine, 340 to 510 rpm; and 5 finishing stands, 250 mm, driven by a 1,200-hp engine, 445 to 600 rpm. 142,000 MT were produced in 1940.

One wheel rim mill, with a forge press and three presses which have capacities of 15-ton, 4.5-ton, and 7.5-ton. 1940 production was 52,000 MT.

Axle forge shop. Production was 52,000 MT in 1940. 29/

Reconstruction Period. In January 1945 it was announced that a strip mill (thin sheet?) and the 280 rolling mill were being repaired and would soon be placed in operation. 30/ By the end of 1945 it was claimed that two sheet mills for thin and medium sheet and the 500 rolling mill had been restored. 31/ In May 1946 it was announced that the restoration of two rolling mills was planned for 1946. 32/ During 1946 it was claimed that a provisory rail mill was put in operation. The mill had been started before World War II, but it had not been completed until the reconstruction period following the war. 33/ In February 1947 it was announced that the new rail mills would soon start working. 34/ In May 1947, however, it was stated that the construction of the new rail mills was lagging. 35/ In September 1950 it was mentioned that the 330 medium sheet mill and the wheel rim mill were in operation. 36/ In August 1951 it was announced that the Dneprodzerzhinsk Metallurgical Plant had mastered the production of channel bars for use in the construction of the foundations of hydroelectric power plant dams. 37/

At Present. It is probable that all the finishing facilities which were in operation in the prewar period are presently in production. A new rail and structural mill may have been added to the plant installations.

i. Intraplant Services.

Water Supply. Water for use of the plant is procured from the Dnepr River. 38/

Locomotive Repair Depot. The first section of the locomotive repair depot started operations in September 1946. The shops of the depot are equipped with a number of modern metal cutting machines, and 10 to 12 locomotives can be repaired simultaneously. 39/

Electric Power and Heating Plant. The mill has its own heating and electric power plant with a capacity of 90,000 kw, which can be supplemented with the power available at the Dneprodzerzhinsk Thermal Power Plant imeni Dzerzhinski. 40/

j. Products and Production.

Products. Before the war and at the present time, products turned out by the Dneprodzerzhinsk Metallurgical Plant included: pig iron, (spiegeleisen), ferrosilicon, open-hearth steel, Bessemer steel, bars, sheet and plate, wire rod and wire, rails, structurals, axle shafts, wheel rims, and other rolling mill products. 41/

Production.

Prewar. 42/

Prewar Production at Dneprodzerzhinsk

Thousand Metric Tons

Product	1931	1933	1934	1935	1936	1937	1938	1940
Pig Iron	512.0	704.0	848.1	929.6			1,216.0	1,377.0
(Hematite)								(92.7)
(Open Hearth Pig)								(716.7)
(Bessemer Pig)								(567.6)
Steel	433.0		1,838.2		814.0		1,255.0	1,875.0
(Open Hearth)	(217.0)	295.0				272.1		(916.0)
(Bessemer)	(216.0)							(959.0)
Rolled Products	(373.0)	470.0	654.4		851.0	1,138.0	1,112.0	
Blooms and Billets								1,596.0
Rails and Structurals			210.9					340.0
Bars								279.0
Sheet								13.0
Plate								97.0
Wheel Rims	21.0	21.0						52.0
Axle Shafts	9.0	15.0	210.9					52.0
Wire and Wire Rods								142.0

Approved For Release 1999/09/02 : CIA-RDP79-01093A000600010003-9

Reconstruction Period and At Present.

Estimated Production at Dneprodzerzhinsk
1948, 1950-1953

Thousand Metric Tons

Product	1948 (Capacity) 43/	1950 44/	1951 45/	1951 46/	1952 47/	1953 47/
Pig Iron	205.0			1,300.0	2,400.0	2,574.9
Steel	300.0	910.0	1,200.0	1,380.0	1,726.5	1,763.0
(Open Hearth)					(1,276.5)	(1,313.0)
(Bessemer)					(450.0)	(450.0)
Finished Steel Products	486.0	900.0			1,242.0	1,269.3

k. Distribution.

The following press items concern the distribution of products by Dneprodzerzhinsk: In May 1948 the plant failed to supply the requisite quantities of rolled metal for ZIS-150 motor vehicles to the Stalin Works, Moscow area. In October 1950, Dneprodzerzhinsk Metallurgical Plant received an urgent order for structurals from the Kuybyshev Power Station. In April 1951, rolled products were being shipped to the Khar'kov, Kuybyshev, and Stalingrad power plants, and to the Volga-Don Canal and the Main Turkmen Canal. 48/

l. Plant Efficiency.

No information available.

m. Administration.

The plant operates under the administration of the Ministry of Ferrous Metallurgy. 49/

n. Personnel.

Number of Workers. Estimates of the number of workers vary between 12,000 and 20,000. Three shifts a day are worked. 50/

Administrative Personnel. The following key personnel were employed at Dneprodzerzhinsk: 51/

Date	Position	Name
March 1946 February 1949 August 1951	Director	N.M. Fomenko
March 1946	Chief Engineer	(fnu) Taranov or Raranov
March 1946	Chief of Blast Furnaces	(fnu) Oreshkin
March 1946	Party Organizer	(fnu) Shchepanski

o. Locational Characteristics.

In 1947 the plant was surrounded by a stone and wooden fence 3 m high. Passes were required for admittance into the plant area. 52/

C. Single Plants.

44. Krivoy Rog Metallurgical Plant imeni Stalin (Krovoroshsky, Komsomolka). [redacted] 25X1A2g

a. Location.

47° 53'N - 33° 24'E. Krivoy Rog, Dnepropetrovsk Oblast, Ukraine SSR. The plant is approximately 4 km southeast of Krivoy Rog. The Dolinskaya-Dnepropetrovsk rail line traverses the plant site. 1/

b. History and Development.

Plans were laid in the mid-1920's for the construction of a large metallurgical combine close to the iron ore deposits. The Freyn Engineering Company of Chicago assisted on the project and reported that in 1929 the plant was planned for the following yearly capacities:

	Metric Tons
Metallurgical Coke	893,000
Pig Iron	1,155,000
Steel	850,000
Finished Steel	695,000

Plans in 1929 included the following installations:

Metallurgical Coke Byproducts Plant (15-ton Ovens, 16-hour Coking Time)	Initial (To be Completed in 1939)	Final (To be Completed in 1945)
Batteries	3	9
Ovens per Battery	55	
Total Ovens	165	442
Blast Furnaces		
800-ton Basic Iron Furnaces	3	8
550-ton Foundry Iron Furnaces	2	2
Basic Open Hearth Furnaces (Stationary).		
125-ton Furnaces	10	28
Rolling Mills		
1,100-mm 2-high Blooming Mill	1	3

	Initial (To be Completed in 1939)	Final (To be Completed in 1945)
600 mm 6-Stand Continous Billet Mill	1	3
450 mm 6-Stand Continous Billet Mill	1	3
250 mm Tandem Merchant Mill	1	3
300 mm Tandem Merchant Mill	1	3
300 mm Semicontinous Mill	1	3
250 mm Semicontinous Mill	1	3
350 mm Tandem Merchant Mill	1	2

Construction of Krivoy Rog began in 1930-31 and was to be completed in 1939. In 1936, planned capacities were announced as follows:

	Metric Tons
Pig Iron	1,645,000
Steel	1,090,000
Finished Steel	900,000

Building of the steel plant progressed as follows: In 1932 the coke plant and byproducts facilities were started. In 1934 the first blast furnace and power plant were completed and in operation. In 1935 the second blast furnace went into operation. In 1936 the coke-chemical plant went into operation. In 1938 the Bessemer plant began production. In 1939 the third blast furnace went into production.

The following installations were scheduled for completion as follows: In October 1941 the blooming mill was to be completed. In 1942, the continuous strip mill was to be completed. In 1942-45 the intermediate and strip mills were to be ready for operation. In 1943 the sintering plant and fourth blast furnace were to be completed.

Completion of the installations at Krivoy Rog was interrupted by the war. Upon the approach of the German Army into the Ukraine, the Russians removed most of the machinery and equipment to the metallurgical combine at Nizhny Tagil. Considerable damage was done to the plant before Soviet reoccupation in 1944, at which time reconstruction and restoration of the mill began.

In 1946 it was announced that the Krivoy Rog Metallurgical Plant was being expanded according to the projects drawn up by the State Institute for Designing Iron and Steel Plants. 2/

c. Raw Materials and Other Inputs.

Prewar. Blast furnaces operated exclusively on Krivoy Rog iron ore, the chief contractor of which was Dzerzhinruda Trust, which controlled the iron ore mines around and to the south of Krivoy Rog. The ore was only partially graded, and most of it contained a considerable portion of fines. Only a small portion of the ore was lumpy. Manganese content was small. The MgO content amounted to approximately 0.1 percent, CaO 0.15 to 0.20 percent, alumina 1 to 3 percent, water content 1 percent, phosphorous content 0.02 to 0.03 percent, and sulphur content 0.015 to 0.03 percent. Krivoy Rog iron ores consisted chiefly of iron oxide and silicic acid. There are, however, several argillaceous ores with a higher Al2O3 content. The iron content of the ore smelted averaged 42 to 60 percent, the silicic acid content between 8 and 32 percent. The following ore analyses illustrate typical compositions:

Ore Body	Fe	SiO_2	Al_2O_3	P	S	CaO	MgO
Otsev	59.45	10.80	2.81	0.027	0.021	0.10	0.16
Grokhochatka (Rich)	59.24	11.60	2.40	0.024	0.023	0.10	0.15
Grokhochatka (Poor)	56.38	16.40	1.03	0.026	0.019	0.10	0.22
Zheltaya Reka	54.32	15.52	2.86	0.041	0.025	1.27	2.59
Valyavka (Lumpy)	54.94	11.20	7.40	0.036	0.015	0.11	0.91
Shaft No. 10	41.80	20.20	13.09	0.063	0.032	0.72	0.80
Quartzite	43.87	31.92	0.08	0.032	0.024	0.10	0.26

Since there was no sintering plant -- although one was planned, and excavations had been started -- and evidently no other means of disposing of fine ore, the ore had to be smelted in the mined condition. The proportion of raw ore in the blast furnace charge generally ran to at least 65 percent. A few mines produced small quantities of lump ore, with the size of the lumps ranging from 30 to 70 mm and sometimes from 50 to 150 mm. The quartzite appeared mostly in lump form. The ore was not sorted at the plant. As mentioned, above, a small amount of ore reached the plant in sifted condition as lump ore. At times small quantities of ore briquettes were delivered. 3/

Manganese Ore. Manganese came from Nikopol'. Types I and II, which contained 43 and 34 to 43 percent Mn respectively, were used in the blast furnaces. Converter slag from the Bessemer plant, which contained approximately 14 percent Mn, was used as a manganese bearer for the blast furnaces. 4/

Limestone. Limestone came exclusively from the Yelenovka quarries in the Donets Basin. Three grades were used, 52 percent, 50 to 52 percent, and 49 to 50 percent CaO, respectively. Limestone available in the immediate vicinity of Krivoy Rog did not have suitable cohesive qualities for use. 5/

Refractories. The greater part of the firebrick and silica brick used came from Chasov Yar in the Donets Basin, and some came from Borovichi in the Valday section. Quartzite, clay, and firebrick for the Bessemer converters came from Tarasovka, west of the Dnepr River. Reportedly magnesite came from Sadinsk in the Urals, and chromite was shipped in from the Urals. 6/

At Present. Although there is no information available on sources of raw materials, the sources are believed to be approximately the same as those of the prewar period.

d. Coal and Coke.

Coal.

Prewar. Coal for processing in the coke plant came from mines in the Donets Basin -- Rutchenkovo, Trudovaya, Semeykino, Almaznaya, and Gumak. The rail haul averaged 300 km. 7/

At Present. Coal is being received from the Donets Basin.

Coke.

Prewar. Coke was supplied by a coke plant located adjacent to the blast furnaces. Small additional quantities of coke were purchased from the Gorlovka Plant in the Donets Basin.

Analysis of Krivoy Rog Coke

Percent

	Coal		Coke	
Components	Range	Average	Range	Average
Ash	7 to 9	8	9 to 12	11
Gaseous Components	15 to 28	24.5	0.5 to 1.0	0.8
Sulphur	2.5 to 3	2.7	1.7 to 1.8	1.75

The manufacturing process for coke was as follows: Coal was unloaded by hand into a deep bunker and transported by conveyer belt to the crusher. After crushing, it was carried by belt to 6 500-ton mixing towers. Up to 6 grades were mixed, and the coal was then moved by conveyer belt to a 4,000-ton coal storage tower. There were 2 coke batteries, with 69 and 67 Becker (or Soviet Koppers) ovens, respectively, which were built in 1935 by Koksokhimontazh, Khar'kov (another source claimed construction by Kramatorsk). Capacity was claimed to be 893,000 MT per year. In 1940-41 a consumption of up to 3,500 MT of coal per 24 hours netted 2,300 to 2,500 MT of coke, or, operating on an average of 330 days per year, 759,000 to 825,000 MT. Two additional coke batteries were under construction. Foundations and gas flues for the first had been laid, and foundations for the second had been completed. The carbonization period lasted from 12.5 to 12.75 hours. Normally a 16-hour period would have been allowed, but lack of coke at the plant necessitated a substantial decrease in the coking time. After quenching the coke dropped onto a conveyer belt, which carried it to a screening plant. Coke over 75 mm was carried to a 50-ton self-unloading car which transported it to the blast furnaces. Smaller size coke was used in the power plant, for domestic fuel, and as second-grade coke in the blast furnaces. The coke ovens were heated by coke gas. Theoretically the consumption of coke gas amounted to approximately 45 percent of the total, but actually it reached 60 percent.

The byproducts plant included the following:

An ammonia plant with 2 saturators, 2 centrifuges, and 1 separator, and a device for pyridine extraction. There was storage for 3,000 MT of ammonium sulphate.

A benzol plant of modern, standard design. 8/

Reconstruction Period. Two announcements were made concerning the reconstruction of coke facilities at Krivoy Rog:

February 1945 -- No. 2 coke battery went into operation.*

January 1949 -- New coke plant was constructed.

August 1949 -- Prisoners of war reported that only one coke battery was in operation. 9/

* The US Embassy in Moscow questioned this item, for it appeared in only one paper, and the usual fanfare in the press over such an accomplishment was missing.

At Present. It is believed that 2 coke batteries, either Becker or Soviet Koppers, with 136 to 138 ovens, are in operation at Krivoy Rog. It is possible that the 2 new coke batteries which were under construction at the time of the German invasion of the Ukraine have been completed. The following estimate of coke-chemical installations was made as of 1952:

Number of Batteries, Becker	2
Number of Ovens	138
Volume of Oven (Cu M)	19.8
Width of Oven, (MM)	406
Normal Coking Time (Hours)	16
Coal Charge per Oven, Dry Basis (MT)	15.1
Total Daily Carbonization Capacity (MT)	3,126
Annual Carbonization Capacity (MT)	1,125,360
Annual Coke Capacity, Dry Basis (MT)	855,274
Annual Coke Capacity, Moist Basis (MT)	880,000
Annual Refined Benzene Capacity (MT)	7,130
Annual Refined Toluene Capacity (MT)	1,672
Annual Crude Tar Capacity (MT)	33,044
Annual Ammonium Sulfate Capacity (MT)	11,961 10/

Another source made the following estimate in February 1952:

Number of Coke Batteries	4
Number of Ovens	260
Annual Coke Capacity (MT)	1,750,000
Annual Refined Benzene Capacity (MT)	14,260
Annual Refined Toluene Capacity (MT)	3,340
Annual Crude Tar Capacity (MT)	66,000
Annual Ammonium Sulfate Capacity (MT)	23,920 11/

At present, two coke batteries are believed to be in operation.

e. Ironmaking Facilities.

Prewar. Three blast furnaces were in operation at Krivoy Rog. Furnaces Nos. 1 and 2, originally designed for a volume of 930 cu m, were placed in operation in 1934-35. No. 3 furnace, with a volume of 1,300 cu m, went into production in 1937.

In June 1941, blast furnace No. 1 was shut down for enlargement and was scheduled to resume operations in late August. The volume was increased to 1,100 cu m. Three stoves were set behind No. 1 furnace, and 7 stoves were placed between No. 2 and No. 3 furnaces. Excavations for the foundations of a fourth blast furnace had been made. No. 4 was to be similar to No. 3. The blast furnaces were of Freyn design with McKee bell distributors with cantilever armoring, 8 to 12 stack columns, and 12 or 16 tuyeres. Hearth armoring was conically riveted.

Dimensions of Krivoy Rog Blast Furnaces

	No. 1	No. 2	No. 3
Hearth Diameter	7.2 m	7.0 m	8.0 m
Depth of Hearth		3.06 m	3.65 m
Depth of Bosh		3.2 m	3.2 m
Belly Diameter		7.85 m	9.0 m
Height of Stack		14.07 m	16.0 m
Diameter of Stack at Throat			6.3 m
Base Diameter		11.3 m	
Capacity	1,100 cu m	930 cu m	1,300 cu m

The stoves had a diameter of 7,800 mm and were of modern design with speedlock and brick linings.

Blowers are described in Intraplant Services, under Power Plant.

Blast furnace gas was removed by 4 uptake pipes, went through the 2 downcomers into a dust catcher and through a Freyn water seal into a cooler. In blast furnace No. 3 the gas passed from the 2 downcomers into 2 separate dust catchers and from those into a third dust catcher, which was installed between the other 2. From the dust catchers the gas went through a zigzag line into a temperature regulator, which was either cooled by a water spray or heated by air-injection. The blast furnace gas passed into an electric filter, which consisted of 12 boxes, 9 of which cleaned 40,000 cu m of gas per hour each, and three of which cleaned 45,000 cu m per hour. Total capacity was 495,000 cu m per hour, and the average performance amounted to 300,000 cu m per hour.

Production of the blast furnaces consisted exclusively of Bessemer iron for the Bessemer steel plant and of foundry iron for shipment to other steel plants. Coke consumption reportedly averaged 1,180 kg per ton of Bessemer iron and 1,250 kg per ton of foundry iron. These consumptions, however, are not in agreement with the following two captured mixture records:

Bessemer Iron Charge	Metric Tons
Otsev (Valyavka) Fine Ore (60 Percent Fe)	4.50
Grokhochatka (Rich Ore, Unclassified)	4.00
Dzerzhinska (Crude Ore, Unclassified) Larger Content of Fine Ore	2.80
Shaft No. 10 (75 Percent Lumpy Ore)	4.80
Scrap (Turnings and Other Waste)	1.00
Manganese Ore	0.05
Bessemer Slag	2.00
Charge (fe-content 53 Percent Equals 10 Tons of Fe)	19.15
Limestone	5.50
Coke	9.60
Total Weight of Charge	34.25

Foundry Iron Charge	Metric Tons
Otsev	1.00
Grokhochatka	6.00
Dzerzhinska	3.00
Shaft No. 10	2.00
Scrap	2.00
Manganese Ore	0.60
Bessemer Slag	
Charge	14.60
Limestone	6.30
Coke	9.60
Total Weight of Charge	30.50

The manganese ore used in the blast furnaces was Type I and Type II. 600 kg of manganese ore were used per charge unless Bessemer slag was used as a source of manganese. Yield of the total mixture averaged 41 percent, which represented 50 to 55 percent actual ore yield. Under good operating conditions, the regular lump coke (77 mm plus) was stretched by adding 15 to 25 percent fine coke (25 to 75 mm) -- 6 charges of lump coke and 1 charge of fine coke, or 10 charges of lump coke and 2 of fine coke. The proportion of dust was very high, amounting to an average of 20 percent of the ore mixture. At blast furnace No. 3 a 2,200 cu m per minute blast gave 1 ton of dust per 19-ton charge, equal to 15 percent; a 2,500 to 2,600 cu m per minute blast gave 3.5 tons of dust per 19-ton charge, equal to 20 percent; and a 3,000 cu m per minute blast gave 11.0 tons of dust per 19-ton charge, equal to 58 percent.

With 20 percent dust, the pig iron production amounted to approximately 1,100 MT per 24 hours. If the dust proportion was reduced through weaker blasting, the pig iron output sank to 700 to 800 MT. Based on actual production of 3 months in 1941, pig iron production was estimated at 90,000 MT per month, or approximately 1 million MT per year. From February through May 1941, the production of Bessemer iron was estimated at 61, 59, 53, and 58 percent, respectively, of total pig iron production.

Types of Pig Iron Produced (Theoretical)

Percent

	Si	Mn	P	S
Bessemer Pig Iron	1.00 to 1.75	0.8 to 1.25	0.08 max.	0.06 max.
Foundry Pig Iron:				
00	3.75 to 4.25	0.5 to 0.8	0.1 to 0.3	0.03 max.
0	3.25 to 3.75	0.5 to 0.8	0.1 to 0.3	0.03 max.
No. 1	2.75 to 3.25	0.5 to 0.8	0.1 to 0.3	0.03 max.
No. 2	2.25 to 2.75	0.5 to 0.8	0.1 to 0.3	0.03 max.
No. 3	1.75 to 2.25	0.5 to 0.8	0.1 to 0.3	0.03 max.
No. 4	1.25 to 1.75	0.5 to 1.25	0.1 to 0.3	0.03 max.

Actual Content: S 0.06 to 0.095, average 0.05
P 0.06 to 0.13, average 0.09

Foundry. The foundry worked only on plant requirements. It contained a 5-ton cupola furnace for gray-iron castings and a 3-ton electric furnace for steel castings. 12/

Reconstruction Period. When the USSR reoccupied the Krivoy Rog Metallurgical Plant, blast furnace No. 1 with all its machinery and equipment and blast furnace No. 3 with 3 of its 4 stoves were destroyed, and the columns of blast furnace No. 2 and 2 of its stoves were badly damaged. Reconstruction of iron-making facilities was slow, as shown in the following report*: In July 1948 the first blast furnace at Krivoy Rog was being restored. In October 1948, blast furnace No. 1 was being reconstructed. In November 1948, blast furnaces were brought into production in 1948 at Krivoy Rog. In 1948 it was announced that a blast furnace was restored in 5 months in 1948. In February 1949, the rehabilitation of the most powerful blast furnace in Dnepropetrovsk at Krivoy Rog was nearing completion. The first pig iron would be produced in the near future. (The furnace referred to is believed to be blast furnace No. 3.) In September 1949 a prisoner of war reported that one blast furnace was in operation and another was under construction. In August 1952, three blast furnaces at Krivoy Rog were in operation. 13/

At Present. Three blast furnaces, approximately of the same dimensions as they had in the prewar period, are in operation at Krivoy Rog.

Estimated 1952 Pig Iron Production at Krivoy Rog**

Blast Furnace No.	Volume (Cu M)	Coefficient	Operating Days	Production (Thousand MT)
1	1,100	0.97	340	385.5
2	930	0.97	340	325.9
3	1,300	0.97	340	455.7
Total Pig Iron Production				1,167.1

* Except for one source, information is from Soviet radio or press.

** See Appendix C, Methodology, for use of coefficient in estimating production.

Estimated 1953 Pig Iron Production at Krivoy Rog*

Blast Furnace No.	Volume (Cu M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
1	1,100	0.95	340	393.7
2	930	0.95	340	329.2
3	1,300	0.95	340	464.8
Total Pig Iron Production				1,187.7

f. Steelmaking Facilities.

Open-Hearth Furnaces.

Prewar. It was planned originally to build 1 or 2 open-hearth shops at Krivoy Rog. In 1934, four stacks and the foundations for the crane runway girders were erected, but construction was halted at that stage. In August 1941 plans were still in the project stage. 14/

At Present. There is no evidence available to indicate that open-hearth furnaces were ever built at Krivoy Rog.

Bessemer Steel Plant.

Prewar. Two Bessemer converters went into operation in August 1939. A third converter was under construction and there was space available for the construction of a fourth. Pig iron was moved from the blast furnaces to the converters in 80-ton ladles. It was de-sulphurized en route by calcinated soda. A 1,300-ton Demag mixer with electrical tipping devices was in place, and the foundations for a second mixer had been laid.

The Bessemers were built by Novo Kramatorskaya Metallurgical Machinery Factory and had the following dimensions:

* See Appendix C, Methodology, for use of coefficient in estimating production.

	MM
Shell, Diameter	4,392
Lining, Diameter	3,630
Over-All Length	7,820

Bottoms: with 33 tuyeres (allegedly 150 to 160 mm); 8 holes, each of which were 12 mm in diameter equaled 300 sq cu blowing average, corresponding to 9 sq cm per ton of pig iron. Bottoms, which were expected to last on an average of 24 operations, did not come up to expectations.

Two electric turbos furnished the air blast; the capacity was 1,500 cu m per minute, at 2.5 atm with a 6,000-kw motor. Finished steel had the following compositions: C, 0.08 to 0.10 percent; Si, 0.01 to 0.03 percent; Mn, 0.30 to 0.45 percent; N_2 (sic), 0.018 to 0.025 percent; S, 0.035 to 0.050 percent; and P, 0.08 percent. Planned capacity, with 4 Bessemers in operation, was 1,415,000 MT per year. In 1941, with two converters in operation, capacity was estimated at 660,000 MT per year. Since there were no rolling mills in operation at the plant, steel ingots were shipped out of the plant for processing. Large quantities went to Dneprodzerzhinsk, and a small amount went to Makeyevka. 15/

Reconstruction Period. No information available.

At Present. Two Bessemer converters are in operation at Krivoy Rog Metallurgical Plant, with a production of approximately 660,000 MT per year. It is possible that 3 converters have been restored, with a production capacity of 1 million tons, but there is no confirmation.

g. Primary Rolling Facilities.

Prewar. No primary rolling mills were in operation at the plant when the Germans moved into the area. A 1,150-mm blooming mill and 1 pair of shears was being assembled and was scheduled to begin operations in December 1941. Capacity of the mill when rolling 250-mm slabs was to be 1.7 million MT, and when producing 350-mm slabs, 1.9 million MT. Plans had been made for the installation of a continous billet mill. 16/

Reconstruction Period. During 1950, installations at Krivoy Rog, weighing 933 MT, were shipped on reparations account from Krupp Gruson, Magdeburg, Germany. 17/

At Present. The blooming mill is probably in operation, but it is doubtful that the billet mill has been installed.

h. Finishing Rolling Facilities.

A forge shop worked only on plant requirements. Six finishing rolling mills were planned for Krivoy Rog. None had been installed in late 1941, and there is no information available to indicate that there are any in operation at the present time. 18/

i. Intraplant Services.

Prewar.

Power Plant. The power plant building was divided into 3 sections, 1 of which contained the boilers, another the control panels, ventilators, and exhaust fans, and the third housed machinery for power and blast generation.

The steam boiler installations consisted of five large vertical tube boilers, Hanomag-type, built in Taganrog during 1933-40. Space for two additional boilers was available. Heating surface amounted to 1,500 sq m, steam pressure was 32 atm, temperature was 425°C, steam generation was 90 to 110 tons of steam per hour per boiler and the average steam generated amounted to 420 to 430 MT.

There were 2 steam turbodynamos on the second floor of the power plant, across from which were 4 steam turboblowers in a row. No. 1 turbodynamo was a twin casing turbine for 29 atm, built by Leningradski Metallicheski Zavod. The exciter and dynamo were on the same shaft, 24,000 kv and 6,300 kv, and they were built by Elektrosila Leningrad. No. 2 had the same description.

Blast furnace blowers No. 1 and No. 2 were steam turboblowers with a steam turbine for 29 atm, and 10,000-hp windblowers for 3,100 cu m per minute. Blowers No. 3 and No. 4 were twin casing turbines from Leningradski Metallicheski Zavod for 29 atm, and 9,000-hp windblowers for 3,100 and 4,100 cu m, respectively, per minute.

Power Balance of Krivoy Rog Metallurgical Plant

	Kw
Power Generation	49,000
Blast Generation, 2 x 10,000 hp	15,400
For Blast Furnaces, 2 x 9,000 kw	18,000
Total Capacity	82,400

Power Requirements of Krivoy Rog Metallurgical Plant

Coke Plant	2,300
Power Plant	5,800
Waterworks, I and II	2,000
Bessemer Plant	5,000
Blast Furnace, for Hoists, and so on.	700
Blast Furnace, for Mud Guns, Compressors, and so on.	600
Electric Furnace in Foundry	600
Total	17,000

Power Distribution from Krivoy Rog Power Plant

Boiler Feed Water	800
Auxiliary Machines for Blast Furnace Blowers (Cooling)	700
Auxiliary Machines for Generators	1,000
Boilerhouse (5 Boilers Each With 1 Ventilator at 150 Kw and 2 Exhausters at 260 Kw Each) at 50 Percent Capacity	1,800
Small Motors and Lighting	800
Miscellaneous	700
Total	5,800

It was estimated that approximately 32,000 kw were available for outside transmission. There were 2 control stations: Station No. 21, 4 transformers at 5,600 kva or 22,400 kva to the 35,000-v line;

and Station KRS, 3 transformers at 10,000 kva or 30,000 kva to the 154,000-v line.

Water Supply. Only a small amount of water was available, since the Inguletz River had a comparatively low water level. In Waterworks No. 1, 2 pumps operated with a capacity of 60 cu m, and 3 with a capacity of 30 cu m per minute. In Waterworks No. 2, 2 pumps operated at 30 cu m and, reportedly, 2 more at 60 cu m per minute. No special purification of the water for the cooling of the blast furnaces took place. The same was true of the water for cooling in the power plant.

Water Consumption per Minute at Krivoy Rog

	Cubic Meters
Blast Furnaces, Including Slag Granulation, and so on.	75.0
Bessemer Steel Plant	1.5
Power Plant	10.0
Total	86.5

Repair Shop.

Woodpattern Shop.

Oxygen Plant. One unit generated 30 cu m per hour. Another unit was planned.

Compressed Air Plant. 240 cu m of compressed air per minute was supplied, principally for the use of construction shops. 19/

Reconstruction Period. In September 1945 it was announced that workers of the turbine shop of Kirov Machine Building Plant were reconstructing a steam turbine with a capacity of 12,000 kva for the Krivoy Rog Metallurgical Plant. In February 1949 a power station was put into operation at Krivoy Rog. In August 1949 the following were reported to be in operation: A machine shop for the repair of plant-owned machinery, a forge shop for the repair of plant-owned machinery, and a railroad repair shop for the repair of plant-owned equipment. In February 1952 it was claimed that power came from the Krivoy Rog Heat and Power Station TETS Krovorozhskiy/

Stalin, which had a rated capacity of 48,000 kw. Emergency power was available from the Dnepr-Donets Power Network. 20/

At Present. No information available.

j. Products and Production.

Products. Products in the prewar period and at present included metallurgical coke and byproducts, basic and foundry pig iron, and Bessemer steel. It is probable that blooms are rolled at present. 21/

Production.

Production at Krivoy Rog
1934-36, 1941, 1952, 1953

Thousand Metric Tons

	Production				Capacity	
Product	1934	1935	1936	1941	1952 Estimate 26/	1953 Estimate 26/
Metallurgical Coke		195.0 22/			880.0	880.0
Pig Iron	103.2 23/	386.4 23/	500.0 24/	1,000.0 25/	1,000.0	1,187.0
Bessemer Steel				660.0 25/	660.0	660.0
Blooms					1,800.0	1,800.0

k. Distribution.

Pig iron, Bessemer steel, and most blooms are shipped out of the Krivoy Rog Metallurgical Plant for further processing.

l. Plant Efficiency.

No information available.

m. Administration.

Krivoy Rog Metallurgical Plant operates under the administration of the Ministry of Ferrous Metallurgy.

n. Personnel.

Number of Workers. In 1941 there were approximately 7,800 workers employed at Krivoy Rog. 27/ At the present time it is estimated that there are 7,000 to 9,000 employees in the plant, working on a three-shift basis. 28/

Administrative Personnel. In January 1950, the following were mentioned: Director of Krivoy Rog Metallurgical Plant - (fnu) Ryazanov. Chief Engineer of Krivoy Rog Metallurgical Plant - (fnu) Myakushko. 29/

o. Locational Characteristics.

In August 1949 the plant was reported to be surrounded by a cinderblock wall approximately 3 m high. Entrances were guarded by civilians and uniformed plant guards. An identification card was required for admission. 30/

45. Nikopol' Pipe and Tube Mill (Nikopol' Metallurgical 25X1A2g kopol' Southern Pipe Plant; "UuTMZ").

[redacted]

a. Location.

47° 35'N - 34° 25'E. Nikopol', Dnepropetrovsk Oblast, Ukraine SSR. The mill is located 2 km northwest of the city on the main highway leading from Nikopol' to Kherson. There are spur tracks leading from the main railroad line into the plant area.

b. History and Development.

The Nikopol' Pipe and Tube Mill was built during the years 1931-34. Before World War II it had been planned to double the capacity of the works with the construction of two new Stiefel mills. The site for the installations was to be a tract of filled land north of the existing works. Foundations for the building were completed, but no further progress had been made. During the war the USSR removed most of the machinery and installations from the existing mill, and it is not believed that the Germans were able to realize any production during their occupation. Reconstruction of the plant began after the departure of the German

Approved For Release 1999/09/02 : CIA-RDP79-01093A000600010003-9

Army, and by the end of 1947 two rolling mill sections of the plant were in operation. 1/

c. Raw Materials and Other Inputs.

Prewar. Raw materials and other inputs were received from the following sources: Billets for pipes and tubes came from Makeyevka, Stalino, Mariupol' (now Zhdanov), and other plants in southern USSR, at the rate of 9,000 to 10,000 MT per month, alloying materials were received from Zaporozh'ye and the Krasny Oktyabr Plant in Stalingrad, refractories came from factories in the immediate area of Nikopol', and fuel oil came from Kherson at the rate of approximately 1,000 MT per month. 2/

At Present. Sources of raw materials are believed to be the same as those of the prewar period. In addition, some billets are being received from Petrovski. It was announced in May 1950 that Nikopol' had been operating ineffectively since it began to receive stock from Petrovski, which had failed in its deliveries. 3/

d. Coal and Coke.

Coal.

Prewar. Coal arrived by rail at the rate of 1,700 MT per month from mines in the Donets Basin.

Coke. Coke also was shipped in by rail from the Donets Basin at the rate of 300 MT per month. 4/

At Present. Coal and coke are both believed to be received by rail from mines and coke plants in the Donets Basin.

e. Ironmaking Facilities.

There are no blast furnaces at Nikopol'. Before World War II an iron foundry, with an unknown number of cupolas, produced approximately 800 MT and had a capacity for the production of 1,600 MT per month. Production consisted principally of castings for use within the plant. 5/ The foundry is in operation at the present time, and 1952 and 1953 production is estimated at 9,000 MT for each year.

f. Steelmaking Facilities.

In the prewar years there was in the steel foundry, a 3-ton electric furnace, which had a capacity of 350 MT per month. 1952 and 1953 production is estimated at 3,000 MT.

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

Prewar.

Seamless Tube Mill. Section I received and stored incoming raw material. The semifinished steel was cut into lengths of 6 to 8 m, went to the mechanical cutters, and was cut to lengths of 1 to 2 m. Between Section I and Section II there were two gravity discharge furnaces, equipped to burn fuel oil or producer gas. Billets were heated and moved to two Stiefel mills. From the piercing mills they were dropped into a chute which carried them to an automatic 2-high mill and later to a 3-stand sizing mill. From the sizing mill they passed either over a roller table to the cooling bed or over another roller to an Abramson-type straightener. The hot rolling mills were in Section II, the sizing mill was in Section III, inspection and acceptance took place in Section IV, thread-cutting was done in Section V, and storage and shipping took place in Section VI.

Cold-drawing Shops. The cold-drawing shops received approximately 20 percent of the pipes directly from the sizing mill and 80 percent from the reducing rolling mill. In the first operation the hot-rolled pipe was pickled in a 5 percent sulphuric acid solution, rinsed in a water bath, moved to drying chambers, and then pointed by two Beche hammers. There were 8 draw benches, and pipes were generally drawn from 57 mm to 52 mm in diameter with a wall thickness of 2.5 mm, although sizes down to 8 mm were produced. Part of the pipes then went to the stamping press. All pipes were moved to the straightening shop, which was equipped with 2 large and 2 small Abramson straighteners. After testing, pipes were cut and shipped.

Rockrite Pipe Cold-reducing Plant. Approximately 500 MT of pipe were produced each month by the Rockrite process, an American method of cold-reducing pipe. Cold-reduced tubing sizes ranged from 42 mm to 58 mm in diameter with wall thickness of 2 to 2.5 mm. There was a total of 12 Rockrite machines in this installation. Production ranged between 300 and 500 MT per month. Chief products were aircraft tubes, with a test pressure of 45 to 55 kg/mm2 and Cr-Mn-Si pipes (Chromansil pipes) with 80 to 90 kg/mm^2 test pressure, also for the aircraft industry. 6/

At Present. It is believed that at the present time two rolling mills are installed at Nikopol' for the production of pipes and tubes. Little is known of the type of equipment installed at the plant, but the following announcements appeared in the press: In February 1947 a new pipe mill was to be commissioned shortly. In March 1947 the Construction Trust Nikopol'stroi was building a separate shop for the production of large diameter seamless tubes for the petroleum industry. In October 1947, rehabilitation of the first section of the plant was completed, and the largest Stiefel rolling mill in the country was placed in operation. The plant delivered its first shipment of seamless pipe in September 1947 to the petroleum industry. In October 1947, the second section of the Stiefel mill was to be finished and in operation by the end of 1947. In January 1948 a huge pipe mill had been commissioned and had begun to supply the Baku oil industry with pipes. In May 1948 a rolling mill was being installed in Section II of Nikopol'. In June 1948, 6 sleeve-joint threading machines and 3 machines for threading oil pipes were being installed in Section II. In November 1949, the pipe-drawing machines in Section I were being made automatic. In September 1950, Section II of Nikopol' had been in operation for some time. 7/

i. Intraplant Services.

Prewar.

Electric Power. 3,500 to 4,000 kw came from the 150,000-v line from Dnepro GES. Power was transformed to 600 v and further to 380 v or 220 v.

Steam. A total of 7 boilers in a boiler house were available for generating steam of 6 atm pressure. The total consumption in winter was approximately 12.5 MT per hour, and in summer approximately 5 MT of steam per hour.

Water. Two pumping stations were in operation. One was on the banks of the Lapenka River, a tributary of the Dnepr, and had 2 pumps for drinking water and 3 pumps for industrial purposes. The other pumping station was within the plant area and had five pumps. Water consumption was 4,800 cu m per day.

Gas. The six producers which were in operation supplied all the reheating furnaces with gas. They were Kerpely type, and each had a hearth area of 7 sq m. Combustion capacity for each square meter was 110 to 140 kg of coal per hour, each kilogram of which represented 3.9 to 4 cu m of gas. 8/

At Present. No information available.

j. Products and Production.

Prewar. Production at Nikopol' included hot-rolled and cold-drawn seamless pipes and tubes. Hot-rolled pipes and tubes amounted to approximately 60 percent of production. The average monthly production of hot-rolled and cold-drawn pipes and tubes at the time of the German occupation amounted to the following:

Average Monthly Production of Hot-Rolled Pipes and Tubes

Product	MT per Month
Oil-Pumping Pipes	2,600
Oil-Drill Pipe	400
Superheater Tubes	1,000 to 1,300
Boiler Tubes	800
Stainless Tubing (Mostly 18 percent Cr and 18Percent Ni)	100
Stainless Pipe for Lenin Plant, Dnepropetrovsk	150
Miscellaneous Pipe for Lenin Plant, Dnepropetrovsk	300
Special Shapes for Shell Fuzes	50
Miscellaneous Pipe	500
Total (Approximately)	5,900 to 6,200

Average Monthly Production of Cold-drawn Pipes and Tubes

Product	MT per Month (Approximate)
Locomotive Pipes	800
Superheater Pipes	100 to 200
Bread Bakery Pipes	100
Drill Pipe for Geological Research Drilling	200
Aircraft Pipes	500
Tractor Pipes (Including Armored Cars)	350
Pipes for Shipbuilding	80
Miscellaneous Pipe	270
Total	2,400 to 2,500

In addition to the above, 500 MT of Rockrite pipe were produced for the aircraft industry. Hot-rolled pipes and tubes were for the most part manufactured with the following dimensions: diameters - 57, 60, 73, 76, 83, 89, 102, 108 and 114 mm; thickness of wall - 3 to 20 mm, with 3.5 to 4.5 mm predominating. Cold-drawn pipes and tubes had a diameter of 8 to 83 mm and a wall thickness of 3 to 10 mm; with 1 to 3 mm predominating. On the basis of the above statistics, the annual production of Nikopol' Tube Mill in the prewar years amounted to approximately 100,000 MT. 9/

At Present.

Estimated 1952 and 1953 Production of Nikopol' Pipe and Tube Mill

Product	MT
Cast Iron	9,000
Electric Furnace Steel	3,000
Pipes and Tubes	75,000 to 90,000

k. Distribution.

In the postwar years pipes and tubes were shipped to the Baku oil industry and to electric power plants at Kuybyshev, Tsimlyanskaya, and Kakovka. 10/

l. Plant Efficiency.

In October 1946 the plant had mastered the productionof stainless steel pipes. In December 1949 a new type of roller for the cold-rolling of structural steel, having 5 times the durability of the usual type roll, had been developed at Dnepropetrovsk Metallurgical Institute, imeni Stalin. These rollers were installed at Nikopol'. In August 1951 the plant fulfilled the Five Year Plan in 3.5 years. 11/

m. Administration.

The plant is under the administration of the Ministry of Ferrous Metallurgy.

n. Personnel.

Number of Employees. Before the war there was a total of 4,970 workers in the plant, but during the war this figure increased to approximately 6,200 persons. 12/

Administrative Personnel. Director of the Nikopol' Tube Mill in October 1947 and in July 1948 was (fnu) Tikhonov. In May 1951 it was announced that the director of the plant was P.A. Trubchenko, and it was mentioned that Tikhonov was Chief of the Directorate of the Pipe Industry. P.A. Trubchenko was named as the chief engineer of the mill in July 1948.

Chief Engineer of the Tube Rolling Mill, in February 1950, was (fnu) Sobolev. 13/

o. Locational Characteristics.

In June 1948 it was reported that the plant was not surrounded by a fence but that it was guarded by civilian plant militia. 14/

46. Novomoskovsk Sheet Mill (Novomoskovsk Tin Plate Rolling Mill; Novomoskovsk Metallurgical Plant). [redacted] 25X1A2g

a. Location.

48° 58'N - 41° 33'E. The plant is located approximately 3 km west of Novo Moskovskiy, Dnepropetrovsk Oblast, Ukraine SSR. It is approximately 25 km north of Dnepropetrovsk. The plant is located on the northern bank of Lake Lenin,* which was formed by the damming project at Zaporozh'ye. It lies parallel to the railroad line and close to the Novo Moskovskiy railway station. 1/

b. History and Development.

Plans for the construction of a tin plate mill at Novo Moskovskiy were made in 1932, and the project became part of the Second Five Year Plan (1933-37), with completion scheduled for the end of 1937. Total capitalization was planned at 91.6 million rubles, of which 46.4 million rubles actually had been spent by 1 January 1936. Before World War II the plant was one of the largest producers of tinplate for the canning industry in the USSR. Other products of the mill included black plate, sheet metal, and roofing material. In the face of the German advance into the Ukraine in the early days of World War II, the USSR stripped the plant of important machinery and installations. No production took place during the German occupation, and in the fight to recapture the area the buildings housing the mill were almost completely razed. Reconstruction began shortly after Soviet reoccupation, and in mid-May 1947 it was announced that the sheet mill for the production of black plate and roofing sheet had been placed in operation and that the production of tin plate would be postponed until the pickling and coating departments of the mill could be restored. In 1946, however, it was reported that the tin plate mill would not be restored and that the buildings which housed tin plate facilities would be used for some other type of production, probably for the manufacture of hardware. In 1952, however, it was announced that the tin plate mill was in operation. 2/

* One source claimed that the lake is nonexistent.

Approved For Release 1999/09/02 : CIA-RDP79-01093A000600010003-9

c. Raw Materials and Other Inputs.

Prewar. Before World War II, raw material came from the following sources: Slabs, 535 x 200 x 15 mm and 5 to 12.5 kg in weight, were shipped into the plant from Kamenskoye (now Dneprodzerzhinsk) and Petrovski. Water came from the Samara River. 3/

d. Coal and Coke.

Before World War II, coal was received by rail from the Donets Basin, and it is probable that it is now being received from the same source. 4/

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

None.

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

Prewar. There were three sheet mills in operation at Novomoskovsk prior to the war. Before the Germans captured the plant, all machinery and installations were removed from the buildings by the USSR.

Sheet Mills No. 1 and No. 2. Each mill consisted of 4, 2-high 720-mm stands, 2 of which were roughing stands and the other 2 finishing stands. The length of the rolls was 800 mm. Each stand was driven by a 1,500-hp electric motor, which had a speed of 40 rpm. Both mills were placed in operation in 1935.

Sheet Mill No. 3 consisted of 2 3-high roughing stands and 4 2-high finishing stands. The roll diameters of the roughing stands were 810/460/810 mm and 1,160 mm long. The finishing stands had 720-mm rolls and were 1,000 mm long. Each stand was driven by a 2,200-hp motor with a speed of 34.6 rpm.

Lifting tables were located on both sides of the roughing and finishing stands. The mill went into operation in 1938.

No information is available on the re-heating furnaces for the three sheet mills. 5/

At Present. It was announced in May 1947 that the Novomoskovsk Sheet Mill, which had been destroyed during the war, had been restored and was back in operation, and that for the time being the plant would manufacture only black and roofing sheet steel. The press release stated also that production of tin plate would not begin until a later date. In September 1952 the plant director announced that sheet rolling and finishing shops of his plant were delivering tin plate and galvanized iron of improved qualities to the food, fish, and construction industries. 6/

i. Intraplant Services.

No information available.

j. Products and Production.

Prewar. The following products were produced at Novomoskovsk:

Tin Plate.

	Millimeters		
Plate Number	Thickness	Width	Length
24	0.21 to 0.27)		
27	0.24 to 0.30)		
30	0.27 to 0.33)	500	355 and 710
35	0.30 to 0.40)		

Black Plate. Dimensions of black plate produced at the mill were the same as those for tin plate.

Roofing Sheet. Black roofing sheet was rolled in weights of 3.25, 3.50, 4.00, 4.50, 5.00, 5.50, 6.00 and 6.50 kg. The width was 710 mm, and the length was 1,420 mm. Roofing sheet of smaller dimensions, 510 x 1,420 mm also was rolled.

Pickled Sheet. Pickled sheet was rolled which had a thickness of 0.30 to 2.00 mm, a width of 510 and 710 mm, and a length of 1,420 mm. 7/

At Present. Production of the sheet mill includes black plate, roofing sheet, tin plate, and galvanized iron. 8/

Production at Novomoskovsk 9/

Thousand Metric Tons

Product	1935	1936	1941	1948	1950	1952	1953
Rolled Products	27.6	120.0	240.0 a/	96.0	300.0	300.0	300.0
Roofing Sheet			40.0 b/				

a. Capacity. Of this amount, 19,000 MT were black plate, 29,000 MT were tin plate, and 192,000 MT were galvanized.
b. Published goal for 1941.

k. Distribution.

In May 1947 it was announced that the plant would produce approximately 15,000 MT of sheet for combines and other agricultural purposes, in addition to the roofing material for housing. In March 1951 it was announced that Novomoskovsk Sheet Mill had sent many tons of roofing material to the Tsimlyansky power station. 10/

l. Plant Efficiency.

No information available.

m. Administration.

In 1941 the plant was under the administration of the People's Commissariat for Ferrous Metallurgy. The present administration is not known. 11/

n. Personnel.

Before World War II there were 3,000 employees engaged in production at the mill. 12/

In June 1948 the director of the plant was (fnu) Grishin; in September 1952 it was (fnu) Rivenko. 13/

o. Locational Characteristics.

No information available.

IV. Zaporozh'ye Oblast.

The Zaporozh'ye Metallurgical Combine imeni Sergei Ordzhonikidze is the only plant in Zaporozh'ye Oblast. It is a large integrated iron and steel plant and is one of the most productive in the USSR.

Estimated 1953 Production at Zaporozh'ye Oblast

	Metallurgical Coke	Pig Iron	Steel	Finished Steel
Total Production (Thousand MT)	2,187.5	1,630.4	1,180.7	850.1
National Share (Percent)	6.3	6.0	4.8	3.7
Regional Share (Percent)	12.2	10.8	15.6	10.6

Summary Table - Zaporozh'ye Oblast

47. Production and Capacity
Zaporozh'ye Metallurgical Combine
imeni Sergei Ordzhonikidze
1953

	Thousand Metric Tons
Metallurgical Coke Production	
5 Batteries - 345 Ovens	2,187.5

Production and Capacity
Zaporozh'ye Metallurgical Combine
imeni Sergei Ordzhonikidze
1953
(Continued)

	Thousand Metric Tons
Pig Iron Production	
4 BF's	1,630.4
Steel Production	
11 OH's and 3 Electrics	1,180.7
Rolling Mill Capacity	
1,100-mm Blooming Mill	1,500.0
750-mm Blooming Mill	400.0
850-mm Plate Mill	300.0
1,680-mm Continuous Wide Strip Mill	400.0
1,680-mm Cold Rolling Mill	N.A.
Finished Steel Production	850.1
Power Plant Capacity	N.A.

Plant Studies - Zaporozh'ye Oblast.

47. Zaporozh'ye Metallurgical Combine imeni Sergo Ordzhonikidze.

[redacted] 25X1A2g

a. Location.

47° 52'N - 35° 08'E. Zaporozh'ye, Zaporozh'ye Oblast, Ukraine SSR. The Zaporozh'ye Metallurgical Combine is located approximately 2 km northeast of the Dnepr Power Plant Dam, on the northern outskirts of the city. The main railroad line from Zaporozh'ye to the north, divides and passes along both sides of the site. The ferroalloy plant is on the west side of the plant area and the waterworks lies immediately to the north. 1/

b. History and Development.

Plans were laid for the construction of a new steel combine at Zaporozh'ye in 1927, and building was begun in 1929-30 with the help of US engineers. Construction coincided with the building of the Dnepr Dam and Hydroelectric Power Plant, which was to be an economical source of power. The Combine, when completed, was to be an example of modern planning: all coke was to be used at the mill, all pig iron produced was to be processed in the open-hearth shops, and all ingots were to be worked in the plant's rolling mills. Departments planned included a coke-chemical plant, four blast furnaces, an open-hearth shop, primary rolling mills, a hot strip mill, a cold strip mill, sheet and plate mills, a ferroalloy plant, and electric furnaces for the production of special steels.

By 1 January 1935, 2 blast furnaces, a small 7.5-sq m open-hearth furnace in the foundry, 4 rolling mill trains, an electric furnace shop for the production of ferroalloys, and electric furnaces for special steels were in operation. One source 2/ claimed the following capacities:

Installation	MT Per Year
Two Blast Furnaces	707,000
Nine Electric Furnaces for Special Steels	75,000
Four Rolling Mills	62,000
Eleven Electric Furnaces for Ferroalloys	65,000

A blooming mill and plate mill went into operation in 1937; a continuous hot strip mill, which was designed and built by the United Engineering and Foundry Company of Pittsburgh, started production in 1938; and a cold strip and light sheet mills were placed in operation in 1939. Immediately before World War II, 3 blast furnaces were in operation and a fourth was ready to be blown in, 10 open-hearth furnaces were producing, and the rolling mill department was complete. Zaporozh'ye was the chief source of hot and cold rolled sheet for the Soviet automobile, aircraft, and tractor industries.

Several sources reported that the USSR evacuated to the Urals the major installations and equipment of Zaporozh'ye in the face of the German advance into the Ukraine. From the evidence available on the reconstruction period, however, it is believed that only the electrical equipment, the easily moved installations, and approximately 1,000 skilled workers were moved out of the area. The charges in all blast furnaces, all open hearths, and probably all electric furnaces were allowed to freeze. Soviet measures were effective, for the Germans were unable to place furnaces in operation during the occupation, and used Zaporozh'ye only for minor repair work. Before the recapture of the plant by the USSR in October 1943, an effective demolition -- with high explosives -- of buildings, installations, equipment, and transportation facilities was accomplished by the Germans.

Reconstruction was begun on a small scale in 1944. A short time later several thousand prisoners of war were shipped into the area to clear the rubble and to reconstruct buildings. In 1949 the repatriation of prisoners of war began, and by 1 January 1950 all had left. It is believed that by early 1950 Zaporozh'ye was restored completely to its prewar capacity and that some increased production was being realized through the use of improved techniques and shop practices. 3/

c. Raw Materials and Other Inputs.

Prewar.

Sources and Consumption of Raw Materials in 1940-41

Raw Material	Source	Consumption Per Year (MT)
Iron Ore	Krivoy Rog	2,030,000
Limestone	Balaklava and Yelenovskiye Kar'yery (Rudniki)	650,000
Dolomite	Nikitovka Dolomite Works	
Fuel Oil		1,000
Blast Furnace Scrap		100,000
Open-Hearth Scrap		400,000 4/

At Present. Sources are believed to be approximately the same as in the prewar period. In addition to those mentioned above, manganese ore is being received from Nikopol'. 5/

d. Coal and Coke.

Coal. Coal for the use of the Zaporozh'ye Metallurgical Combine has always been received by rail from the Donets Basin. From the coal dump, the coal is transported by belt conveyer to screeners and crushers. It is then loaded on another belt conveyer and taken to a coal mixer. A belt also carries the coal from the mixers to the hoppers at the coke ovens. During the winter months the coal arrives frozen and is thawed by hot air before it is dumped. 6/

Coke.

Prewar. Prior to World War II the Zaporozh'ye Coke-Chemical Plant consisted of 4 coke batteries, each with 69 Becker-type ovens. Total oven capacity was 5,464 cu m. Each oven had a capacity of approximtely 14.5 MT per charge. Coke production was estimated at 4,000 MT per day, or 1.2 to 1.3 million MT per year. Since blast furnaces used approximately 3,500 MT per day, some coke was shipped out of the Combine to other plants in the Ukraine. The coke was screened before distribution. Coke-slack (0 to 10 mm in diameter) was used in the soaking pits and in the boilerhouse of the repair and maintenance sections of the plant. Small coke (10 to 30 mm in diameter) was used in the ferroalloy plant, and larger coke (30 mm and over in diameter) was consumed in the blast furnaces. Approximately 70 percent of the coke produced was used for the making of pig iron. The Zaporozh'ye coke plant was largely destroyed by the USSR before the German advnace into the Ukraine. 7/

Reconstruction Period. Reconstruction of the coke-chemical plant began early in 1947. In October 1947, coke battery No. 3 was in operation. On 28 November 1947 it was announced that No. 2 battery with 69 coke ovens was placed in operation. In late December it was claimed that a third coke battery would be placed in production during 1948. In May 1948 it was announced that battery No. 4 was nearing completion and that it would be in operation in July. In February 1949, battery No. 1 was still under construction. The benzol plant was in production. In October 1949 it was announced that both the benzol plant and the tar plant were in operation. It was stated also that 2 coke plants, each consisting of two batteries of 69 coke ovens each, were in production. One source who worked in the plant until November 1949 provided the following information on coke plant operation. All equipment, such as hopper cars and pusher rams, was of American manufacture and was marked plainly as such. Approximately 15 MT of coal were charged into each oven. Temperatures varied from 1,100°C to 1,300°C, depending upon the quality of the coal. Temperatures were recorded by electrical instruments. Yield amounted to approximately 11 MT of coke for each 15 MT of coal charged 73.3 percent. 8/

At Present. On 1 August 1953, Moscow Radio announced that a new coke battery had been placed in operation, which raised the number of batteries to five.

Estimated 1952 and 1953 Production Capacity of Zaporozh'ye

	1952	1953
Number and Type of Batteries	4 Becker	5 Becker
Number of Ovens	276	345
Volume of Oven (cu m)	19.8	19.8
Width of Oven (mm)	406	406
Normal Coking Time (hours)	16	16

Estimated 1952 and 1953 Production Capacity of Zaporozh'ye (Continued)

	1952	1953
Coal Charge per Oven, Dry Basis (MT)	15.1	15.1
Total Daily Carbonization (MT)	6,250	7,812
Annual Carbonization Capacity (MT)	2,250,360	2,812,950
Annual Coke Capacity, Dry Basis (MT)	1,710,000	2,137,500
Annual Coke Capacity, Moist Basis (MT)	1,750,000	2,187,500
Refined Benzene Capacity (MT per year)	14,175	17,720
Refined Toluene Capacity (MT per year)	3,325	4,156
Crude Tar Capacity (MT per year)	65,713	82,141
Ammonium Sulfate Capacity (MT per year)	23,258	29,072 9/

e. Ironmaking Facilities.

Prewar. Before the German occupation of Zaporozh'ye there were 3 blast furnaces in operation and 1 blast furnace under construction, close to completion.

Description of Zaporozh'ye Blast Furnaces

Furnace Number	Volume (cu m)	Hearth Diameter (mm)	Number of Stoves	Year Placed in Operation
1	950	7,040	3	1933
2	950	7,040	3	1934
3	1,300		4	1938
4	1,300		4	Not in Operation

The blast furnace boilerhouse, fired with blast furnace gas, included six boilers. Boilers No. 3 and 4 were built by Steinmuller, had a heating surface of 1,500 sq m, and produced 75 to 100 MT of steam per hour. Boilers No. 1, 2, and 5 were Soviet-built, had a heating surface of 1,250 sq m, and produced 75 MT of steam per hour. The size and capacity of No. 6 is not known. A foundry contained 2 cupola furnaces of 10-ton capacity each, one 5-ton cupola, and one 7.5-ton open-hearth furnace. Annual production of pig iron amounted to approximately 1 million MT. One source claimed the following consumption of raw materials by the Zaporozh'ye blast furnaces:

Consumption of Raw Materials
per Metric Ton of Pig Iron
1934-36

Metric Tons

Raw Material	1934	1935	1936	
Iron Ore	2.052	1.873	1.656	
Limestone	0.614	0.536	0.519	
Metallurgical Coke	1.171	1.048	0.971	10/

Reconstruction Period. Charges were allowed to freeze by the USSR in those blast furnaces which were in production, and blast furnace No 4 was blown up before the arrival of the Germans in World War II. Reconstruction began early in the spring of 1947.

In July 1947, blast furnace No. 3, with a capacity of 1,300 cu m, was in operation. In July 1948, blast furnace No. 4, with a capacity of 1,300 cu m, and with 4 blast stoves, was mentioned as being in operation. This all-welded furnace, the first in the USSR, was constructed by the Molotov Plant in Dnepropetrovsk. Early in March 1949 the reconstruction was announced of blast furnace No 2, with a volume of 930 cu m, and in August the furnace was placed in production. On 28 December 1949, blast furnace No. 1, with a capacity of 930 cu m, was blown in. 11/

Improvements in Practices. In July 1947 it was announced that the restoration of blast furnace No. 3 had been completed and that it would have the same capacity as the one damaged during the war, but that it would work on high top gas pressure. The furnace, Cowper stoves, and gas pipe lines would be of an all-welded construction. 12/ In January 1950 it was published that a new method of operating blast furnaces, which had originated at the Dnepropetrovsk Metallurgical Institute imeni Stalin, was being used at Zaporozh'ye. 13/ In September 1952 it was announced that the blast furnace coefficient for January through October 1952 was 0.96.

At Present. Four blast furnaces are in operation at the Zaporozh'ye Metallurgical Combine.

Estimated 1952 Production of Pig Iron at Zaporozh'ye*

Blast Furnace Number	Volume (cu m)	Coefficient	Operating Days	Production (Thousand MT)
1	930	0.96	340	329.3
2	930	0.96	340	329.3
3	1,300	0.96	340	460.4
4	1,300	0.96	340	460.4
Total Pig Iron Production				1,579.4

Estimated 1953 Production of Pig Iron at Zaporozh'ye*

Blast Furnace Number	Volume (cu m)	Estimated Coefficient	Operating Days	Production (Thousand MT)
1	930	0.93	340	340.0
2	930	0.93	340	340.0
3	1,300	0.93	340	475.2
4	1,300	0.93	340	475.2
Total Pig Iron Production				1,630.4

* See Appendix C, Methodology, for use of coefficient in estimating production.

f. Steelmaking Facilities.

Open-Hearth Furnaces.

Prewar. Prior to the German occupation of Zaporozh'ye there were 10 150-ton open-hearth furnaces, arranged in a single row, in operation at the Combine. Space was available for 3 or 4 additional furnaces, and the foundations had been laid for 2 new furnaces. The charging doors of the 10 furnaces in operation were set high, so that 185-ton charges were possible. According to engineers at the plant, each furnace produced approximately 250 MT per day, or a total of 820,000 MT of steel per year. Capacity of the shop was approximately 900,000 MT per year. Not all steel was cast into ingots. Approximately 50,000 MT per year were used for duplexing in the adjoining electric steel plant. According to the engineers, output was low for the size of the installations; this probably was attributable to the short life of the furnace arches which, allegedly, lasted only for 75 to 120 heats. It was thought that the increased size of the bath, permitted by the position of the charging doors, resulted in increased strain on the furnace arches. All furnaces were fired by coke and blast furnace gas.

Sources differed on the hearth areas of the open-hearth furnaces:

Open Hearth Number	Hearth Area (sq m) Source 14/	Hearth Area (sq m) Source 15/	Year Placed in Operation
1	61.5	62.0	1935
2	61.5	62.0	
3	61.5	62.0	
4	61.5	62.0	
5	54.5	55.5	1936
6	66.0	55.5	1940
7	66.0	55.5	1940
8	66.0	55.5	1940
9	66.0	53.0	1940
10	66.0	53.0	1940
a/	7.5	7.5	

a. Small open-hearth furnace in the foundry.

The equipment of the open-hearth shop included a 750-ton hot-metal mixer, which was located in a separate building.* 16/

Reconstruction Period. The reconstruction of the open-hearth furnaces lagged in comparison to the restoration of other parts of Zaporozh'ye. It was not until April 1948 that the first furnace went into operation. In May 1948, open hearth No. 3 had been restored and was drying out, the second furnace to be reconstructed at the plant. At the same time the third furnace also was drying out. In July 1948 it was announced that open hearth No. 3 was in operation. In the same month newspapers carried the item that open hearth No. 5 had been reconstructed, the fifth to be restored in 1948. In November 1948 it was announced that open hearth No. 6 had been reconstructed. In January 1950 the operation of open hearth No. 4, 6, and 7 was mentioned in the press. In October 1950 it was announced that the tenth open-hearth furnace at Zaporozh'ye was in operation.

Information from prisoners of war, many of whom were in the plant until December 1949, varies concerning the number of open-hearth furnaces in operation at the Combine. Several claimed that 12 furnaces were in operation, and several others claimed that 12 furnaces were planned for the end of 1950, of which 10 were in operation and 2 were in the final stages of construction. It is possible that the USSR did not destroy the 2 foundations for the 11th and 12th furnaces, which had been laid before World War II, and that the prisoners of war assumed that 2 additional furnaces were to be completed after their repatriation. 17/

Improvements in Practices. In November 1948 it was stated that Zaporozh'ye was producing 5.7 MT of steel for each square meter of hearth area. In October 1949 it was announced that the plant had realized a steel coefficient of 7.45 (sic) for the first half of the year, as compared to the previous rate of 4.8. On 22 October 1949 the steel coefficient for Zaporozh'ye was set at 4.8 MT. In February 1950 the norm for the production of steel at Zaporozh'ye was announced as 5.5 MT for each square meter of hearth area. In March 1950 the steel coefficient for the open hearths Nos. 4, 6, and 7 was set at 5.5 MT for each square meter of hearth area. In February 1952 it was announced that the roof life on open hearth No. 10 had

* During the reconstruction period many prisoners of war claimed that this mixer was a Bessemer converter. None of these ever saw it "blow."

been increased from 250 to 400 heats. In two open hearths the usual furnace crowns had been replaced by chrome-magnesite in preparation for increased production.* 18/

At Present. Ten open hearths, with volumes of approximately 150 to 170 MT, plus one small furnace in the foundry, presently are in operation at Zaporozh'ye Metallurgical Combine. One source 19/ claimed that in 1950 there were 10 furnaces in production with a hearth area of 52.0 sq m each, and that output amounted to 885,000 MT of steel. It is believed, however, that the furnaces were rebuilt to no less than their prewar size and that probably they were made larger.

Estimated 1952 Open-Hearth Steel Production at Zaporozh'ye**

Open Hearth Number	Hearth Area (sq m)	Coefficient	Operating Days	Production (Thousand MT)
1	62.0	5.5	325	110.8
2	62.0	5.5	325	110.8
3	62.0	5.5	325	110.8
4	62.0	5.5	325	110.8
5	55.5	5.5	325	99.2
6	55.5	5.5	325	99.2
7	55.5	5.5	325	99.2
8	55.5	5.5	325	99.2
9	53.0	5.5	325	94.7
10	53.0	5.5	325	94.7
	7.5	5.5	325	13.4
	Total Open-Hearth Steel Production			1,042.8

* FM Comment: These changes sound like the conversion of the furnaces to a basic open-hearth roof and possibly to an all basic furnace.

** See Appendix C, Methodology, for use of coefficient in estimating production.

Estimated 1953 Open-Hearth Steel Production at Zaporozh'ye*

Open Hearth Number	Hearth Area (sq m)	Estimated Coefficient	Operating Days	Production (Thousand MT)
1	62.0	5.7	325	114.8
2	62.0	5.7	325	114.8
3	62.0	5.7	325	114.8
4	62.0	5.7	325	114.8
5	55.5	5.7	325	102.8
6	55.5	5.7	325	102.8
7	55.5	5.7	325	102.8
8	55.5	5.7	325	102.8
9	53.0	5.7	325	98.2
10	53.0	5.7	325	98.2
	7.5	5.7	325	13.9
	Total Open-Hearth Steel Production			1,080.7

Electric Furnaces.

Prewar. The electric steel plant at Zaporozh'ye produced special steels by the duplex process and received its molten metal from the open-hearth shop of the Combine. Often referred to as the 30 Shop, the mill contained 3 30-ton German-made "Siemens and Halski" electric furnaces, which could be overcharged. It was estimated by German engineers that in using the molten charge, 5 charges could be made daily, which would have resulted in a monthly production of 10,000 MT, or 120,000 MT per year. Capacity, therefore, was estimated at 120,000 MT per year. The duplex metal had a 0.03 percent sulfur content upon charging, but neither the carbon content nor the proportion of molten metal used in the charge could be determined. 20/

Reconstruction Period. Rebuilding of the electric furnace shop did not begin until early 1948. In November 1948 the first section of the special high-quality steel works was restored and placed in operation. In September 1949 it was announced that the electric furnaces

* See Appendix C, Methodology, for use of coefficient in estimating production.

for high grade steel were producing 60 MT per day on a 2-charge per day basis. In October 1949 it was claimed that two furnaces were in operation and that a third was under construction. In January 1950 it was announced that the reconstruction of the special steel plant at Zaporozh'ye was started in 1948, and that the plant had 4 12-ton gantry cranes and two "Siemens and Halski" 30-ton electric furnaces. It was claimed that two more electric furnaces would be added. In May 1951 it was reported that the Zaporozh'ye Metallurgical Combine had a highly productive electric arc furnace for steel smelting. 21/

At Present. On the basis of the above information, it is believed that 3 30-ton electric furnaces are in operation at Zaporozh'ye and that probably 4 furnaces are producing at the Combine. 1953 production is estimated at 100,000 MT. 22/

Ferroalloy Plant.

Prewar. The Ferroalloy Plant at Zaporozh'ye was located on a site adjacent to the Combine's aluminum plant. It was planned originally that only ferromanganese would be produced, but in 1934 it was decided that since the output of ferrosilicon at Chelyabinsk was not sufficient, Zaporozh'ye also would produce ferrosilicon and other ferroalloys.

In 1935 the production planned called for the following:

Ferroalloy	Amount (MT)
Ferrosilicon, 45 Percent	60,000
Ferrochrome, High Carbon	10,000
Ferrochrome, Low Carbon	6,000
Ferrotungsten	3,000

For the production of ferrosilicon there were 6 Miguet-perron single-phase electric furnaces, 10,000 kw, which had a diameter of 5,350 mm and a height of 1,585 mm. The electrode consisted of 24 sections and operated continuously. It was 3,855 mm in diameter and weighed approximately 100 MT. There were 4 exhausts for removing gases. Metal was tapped every 70 to 90 minutes, and ingots weighed 3.5 MT.

A US electric furnace manufacturer described the furnaces as follows:

> "Most interesting are the French Miguet furnaces. Each is a single phase, 11,000 kva, stepping down from 36,750 volts to a variable between 25 and 55 volts, with 56 voltage steps made under load. The switching arrangement is most elaborate and costly, so much so, that some prominent US manufacturers would not bid on it -- the transformers likewise. The electrode is 4 m in diameter. The outside is an annular ring, made of close-fitting, dovetailed-effect block and inside stamped much the same way as the Soderburg."

For the production of ferrochrome, ferrotungsten, and other alloys, there were 5 French Heroult electric furnaces, at 800/1,500 kw, with 3 electrodes each. These furnaces had a capacity of 10 to 35 MT per day. In the Ferroalloy Plant there were 4 60/36,000-kva transformers. The 11,400-kva transformers were manufactured by Siemens-Schukert. 23/ A calcium carbide plant was built in 1931-32 which had a capacity of 20,000 MT per year. 24/

Reconstruction Period. In July 1948 it was announced that during the past 6 months, under the direction of Ya. Dashevskiy, the carbide production plan was fulfilled 125 percent, a transformer station of 3,000 kv, was restored, and the fourth ferroalloying furnace was placed in operation on 30 June.

In December 1949, prisoners of war reported that 2 of the original 5 furnaces (probably Heroults) had resumed operation by the end of 1949. It was claimed that the plan was to expand the shop to eight furnaces. Ferromanganese, ferrosilicon, and ferrotungsten were produced. The calcium carbide plant was in operation.

In October 1950 it was announced that the Zaporozh'ye Ferroalloy Plant had already completed the yearly program for the production of carbide by 101 percent, costs had been lowered 24 percent, considerable savings had been realized in electricity, improvements in techniques had resulted in increased production, and a new electric furnace had been built by factory workers.

In March 1951, Vasily Fedorovich Volkov, Chief Engineer of the Zaporozh'ye Ferroalloy Plant, and four others, were awarded a Stalin Prize, Third Class, for working out and putting into practice a new technique for obtaining pure manganese. 25/

At Present. All departments of the Ferroalloy Plant are believed to be in operation, but the number, capacities, and size of furnaces are not known.

g. Primary Rolling Facilities.

Prewar. There were two blooming mills in the Combine: One 1,100-mm blooming mill with an estimated annual capacity of 1.4 million MT was in the steel mill. This installation was served by 8 groups of soaking pits, each group consisting of 4 furnaces fired with coke gas. The furnaces were 4,000 mm long, 2,250 mm wide, and 3,300 mm deep. Each pit could hold 8 8-ton ingots.

The second mill was in the Refined Steel Mill. This was a 3-high, 750-mm blooming mill of 2 stands. It had an estimated capacity of 400,000 MT per year.

From the primary rolling mills the slabs were sent to three preheating furnaces. Selected material went to the wide strip mill for rolling, and the remainder was sent to the intermediate plate mill. 26/

Reconstruction Period. In July 1947 a blooming and slabbing mill was placed in operation. In December 1949 a prisoner of war reported that 6 soaking pits were in operation, that 8 others which had been badly damaged during the war were being reconstructed, and that traveling cranes removed the ingots from the furnaces to a conveyer which transported them to the blooming and slabbing mills. 27/

The following description of the 1,100-mm blooming and slabbing mill appeared in Polish technical journals in 1948:

"Ingots are transported from the stripper to the soaking pits, which contain eight groups of four furnaces each, heated by blast furnace gas.

"The Universal-type slabbing mill was designed by the Stalin works, Novo-Kramatorsk, and is described as follows:

Horizontal rolls - barrel diameter	1,100 mm
neck diameter	680 mm
length of roll	2,200 mm
Vertical rolls - barrel diameter	680 mm
neck diameter	450 mm
length of roll	1,200 mm
Lift of horizontal rolls - maximum	900 mm
minimum	65 mm
Setting limit of vertical rolls - maximum	1,800 mm
minimum	600 mm
Speeds of lifting the rolls - upper horizontal	55 mm/sec
vertical rolls	33 mm/sec
Size of ingots handled -	4.5 to 15 MT

"Production program - slabs 65 to 200 mm thick; 600 to 1,500 mm wide; 1,500 mm to 4,500 mm long.

"5,000-hp, DC, 100 rpm motors are used for driving the horizontal rolls. The two vertical rollers are driven by a 2,500-hp, DC, 275-rpm motor. The rolls are driven by an Ilgner-Leonard unit consisting of a 2,000-hp synchronous motor, three 3,500-kw generators, and an 85-ton flywheel.

"The blooming mill has an annual capacity of 1.6 million MT, of which approximately 700,000 MT are for automotive sheet metal, containing 0.18 percent carbons." 28/

At Present. Two blooming mills are in operation at Zaporozh'ye Metallurgical Combine: 1 1,100-mm mill with an annual capacity of approximately 1.5 million MT in the steel plant, and one 3-high, 2-stand, 750-mm blooming mill with an annual capacity of approximately 400,000 MT in the refined steel mill.

h. Finishing Rolling Facilities.

Prewar. The following finishing facilities were in operation at the Combine in the prewar years:

Steel Mill: One intermediate plate mill, which consisted of 1 2-high, 850-mm roughing stand and one Lauta 3-high, 850-mm finishing stand. Annual capacity was estimated at 300,000 MT.

One continuous wide strip mill, which consisted of 4 roughing stands and 6 finishing stands.

One cold rolling mill with an estimated annual capacity of 150,000 MT. There were 4 straightening machines and 23 annealing furnaces.

Refined Steel Plant: One 450- to 480-mm heavy bar mill; one 360/280-mm small bar mill; a forge shop which contained 13 hammers; and a building to house a wire mill was completed, but installations and machinery had not been put in place. 29/

Continuous, Wide Strip Mill. In 1934-36 the United Engineering and Foundry Company of Pittsburgh designed a 1,680-mm continuous hot strip mill for the Zaporozh'ye Metallurgical Combine. In this mill slabs were removed from 3 50-MT/per hour gas-fired reheating furnaces, and passed through the 1,690-mm, 2-high roughing scale-breaker. When full width slabs were available, corresponding to the width of the strip, length-wise rolling was done. To permit the rolling of maximum width strip from slabs of lesser width, the first roughing stand was a 2,438-mm, 4-high broadside mill, so that the slab could be rolled and then turned for lengthwise rolling. For such purposes the stand was preceded and succeeded by turn tables for rotating through 90° and an overhead pusher was available for assistance in entering the slab for the pass. Motor-operated side guards kept the slab centered for smooth and rapid passage down the mill. Following the broadside mill was an electrically-driven, crank-type slab reducer to straighten and true-up the slabs after the broadsiding. The remainder of the roughing mill train consisted of 3 stands of 1,680-mm, 4-high mills, each preceded by motor-driven edgers. Work rolls on the broadside mill were 915 mm and on the roughing stands, back up rolls were 1,320-mm and 1,240-mm, respectively.

After traversing the intermediate cooling table, the strip entered the finishing train at a reduced speed, first passing through a flying shear which was arranged to crop off both front and back ends. Next in line was a 1,680-mm, 2-high mechanical scale-breaker, followed by 6 stands of a 4-high, 1,680-mm finishing mill which reduced the strip to final thickness, finishing at speeds up to 1,500 feet per minute. Work rolls on the finishing stands were 610 mm and on the backup rolls, 1,240 mm. For cutting to sheet lengths a flying shear was driven mechanically from the last stand, assuring great accuracy in shearing, crop control being obtained by separately accelerating and synchronously coupling the shear drum. Hot coiling was done by 3 internal expanding coilers, located approximately 12,000 mm down the run out table, beyond which was located a depressing type piler, to receive the cut-to-length sheets at the highest mill speed.

The material in the hot finishing department could be given several types of treatment: open annealed, pickled, skin passed, oiled, and shipped; or, depending upon the quality desired, skin passed as black sheet without pickling, or pickled and skin passed without annealing. Facilities included levelers, pickling, and scrubbing lines. The skin pass mill was equipped with 2 4-high 1680-mm stands, having both 420-mm work rolls and 1210-mm backup rolls mounted on spherical roller bearings. In addition, squaring and rotary slitting shears, leveling and oiling equipment, ample inspecting facilities, and sufficient storage space were provided.

Just before the German occupation of Zaporozh'ye, output was estimated at 390,000 MT per year.

The Germans estimated that approximately 33 percent of the strip mill was dismantled and removed by the USSR. 30/

Description of Cold Rolling. Adjacent to the pickling section was a 3-stand, 1680-mm, 4-high tandem cold mill designed to maintain a separating force of 3.5 million pounds. It was equipped with tapered roller bearings. Two 4-high reversing cold mills -- one was a 1680-mm mill and the other 1060-mm -- mounted on spherical roller bearings were built. The larger mill and bearings were designed to sustain an average separating force of 3.5 million pounds, and the smaller one somewhat under 2.5 million pounds.

Material on leaving the cold reduction mill was transferred to the processing section, where it was prepared for normalizing and annealing with provision for both coils and sheet. Approximately 24 double box annealing furnaces with automatic charging equipment were provided. In addition, the processing department had annealing and normalizing furnaces, pickling, scrubbing, and drying equipment for the normalized material, together with flying shears, side trimming machines, and roller levelers.

The cold finishing department consisted of a series of 7 temper mills: 2 were 4-high, 1,680-mm mills, 4 were 1,060-mm mills, and one was a 4-high, 1,680-mm mill with coilers. All machinery and electrical equipment, including several cranes, were removed by the USSR. 31/

Reconstruction Period. Reports of the restoration of finishing facilities at Zaporozh'ye Metallurgical Combine were as follows: In May 1947 the continuous hot strip mill, which had been dismantled during World War II, resumed operation. In July 1947 it was announced that a thin sheet mill would be completed by August 1947, and that a section of the cold rolling mill would be in operation in September. In October 1947 it was announced that Zaporozh'ye had resumed the production of sheet steel. In January 1948 a prisoner of war observed that the stands of the wide strip mill were marked "United." The cold rolling mill was restored on 28 September 1949. In October 1949 a prisoner of war claimed that the sheet mill was producing 2,700 MT per day.

In October and November 1949, several prisoners of war reported that excavations had been completed for the foundations of a new rolling mill building and that a bar or structural mill, dismantled from a plant in Magdeburg, Germany, was stored alongside the building site. A foreman claimed this mill would be in operation in 1951-52. In January 1952 it was announced that a large sheet mill had been constructed for the Combine by the Alma-Ata Heavy Machinery Plant. 32/

At Present. All finishing facilities which were in operation before World War II including the intermediate plate mill, the continuous wide strip mill, the cold rolling mill, and the forge are not operating. In addition, a new bar or structural mill, removed from East Germany, is probably in production. 33/

i Intraplant Services.

Prewar. A team of German engineers, who inspected the plant after the Soviet withdrawal, reported the following on the power supply as they found it:

"Apart from the blast furnace installation's blower house, which is equipped with turbo-blowers, the plant had no power installation. The steam for the boilers was produced in a gas-fired boilerhouse. All required power was drawn from the high-tension net of the neighboring Dnepro Hydroelectric Plant. No information was available on power consumption - no coke gas, blast furnace gas, or coal balance could be found. There was also no information available on the water supply. No damage was observed from explosives in the electric power or water supply systems, and the gas pipe lines are probably in very good condition. However, the plant suffered heavy damage through the removal of machinery. There is no trace of transformers, pumps, control stations, motors, or anything of such a nature. In some places the Soviets have even torn up and shipped eastward the underground cable which was laid at a depth of two m." 34/

Reconstruction Period. The following information concerns the reconstruction of power facilities at the plant: In May 1947 the thermal electric power station at Zaporozh'ye was mentioned as being in the process of restoration. In July 1947 it was announced that the TETS (Heating and Electric Power Plant) of Zaporozh'ye was reconstructed. In June 1947, two items appeared in the press: Substation M (metallurgical) of the Zaporozh'ye plant was included in the network of Dnepro Energo and had given electric current to the main distributor of the central thermo-electric power plant and to the two pumping stations, the river side station and the main pumping station; and a huge electric substation had been completed and would feed power to 24 distributing centers. In all, there were 50 substations in the Zaporozh'ye Combine.

In 1948, Zaporozh'ye received 6,000-volt current from Dnepro Energo network. Two Ward-Leonard aggregates were used to provide power. In September 1949 a prisoner of war reported that electric power came from the hydroelectric plant, Dnepro GES, via overhead high tension wires, which carried 110,000 volts. Inside the plant there were several transformer stations. At the main transformer station, voltage was stepped down and power was passed to smaller stations, from which power emanated at 380-volt, three-phase current for running machinery. The source claimed that the electric power supply frequently fell short of the needs of the plant. In January 1950, 30 prisoners of war reported that a small percentage of electric power was supplied by the Combine's own TETS plant, which had a boilerhouse with 4 vertical-tube boilers producing steam at 16 atm. Blast furnace gas and coal dust were used for fuel. Steam boilers were used with a steam turbogenerator for the generation of power and with turbocompressors for the generation of air blast. A large percentage of electric power came from the Zaporozh'ye Power Plant through a plant-owned transformer station. Incoming power was reduced to 6,000 v. 35/

Other installation restored at the plant included:

Pumping Station. A completely new structure was started in the winter of 1947 and completed in mid-1948. It contained 7 centrifugal pumps installed on 7 concrete foundations. The pumps were manufactured by plants in Kiev and Leningrad. Two concrete water reservoirs were built adjacent to the pumping station during the summer of 1948. Water came from the Dnepr River.

Concrete Plant.

Locomotive and Railroad Freight Car Repair Plant. This plant repaired the rail equipment of the Combine.

Glass Wool Insulation Plant. Insulation made from blast furnace slag was produced.

Refractory Plant.

Oxygen Plant.

Scrap Crushing Installation. 36/

j. Products and Production.

Products. Products of the Zaporozh'ye Metallurgical Combine, before World War II and at the present time, include: metallurgical coke and by-products; pig iron; iron castings; ingot steel, open-hearth and electric; slabs and blooms; hot and cold steel strip; steel plate; cold-rolled sheet steel; alloy and quality steels, including chrome steel, chrome-nickel steel, and ball bearing steel; ferroalloys, including ferrosilicon, ferromanganese, ferrochrome, and ferrotungsten; calcium carbide; forgings; and machine and fabricated parts and equipment. 37/

Production.

Production of Zaporozh'ye Metallurgical Combine

Thousand Metric Tons

Product	1934 38/	1935 38/	1940 39/	1941 40/	1948 41/	1950	1952	1953
Metallurgical Coke							1,750.0 42/	2,187.5 42/
Pig Iron	455.6	599.0	1,400.0	1,400.0	1,950.0	885.0 44/	1,579.4 43/	1,630.4 43/
Steel	53.7	120.7			1,800.0 a/	1,000.0 a/ 45/	1,142.8 43/	1,180.7 43/
Rolled Products	37.8	64.0				720.0 45/	822.8 43/	850.1 43/
Ferroalloys				73.0 b/				

a. Estimated capacity.
b. Planned Production.

Approved For Release 1999/09/02 : CIA-RDP79-01093A000600010003-9

k. Distribution.

Prewar. One publication gave the percentage distribution of tool steel to consumers by the Zaporozh'ye Metallurgical Combine in 1935 as follows:

	Percent
State Ball Bearing Plant, Kaganovich	22.4
Aviation Industry	21.0
Metallurgical Plant, Stalino	8.7
Chelyabinsk Tractor Plant	4.4
Gor'ky Automobile Plant	2.0
Stalingrad Tractor Plant	0.9
Miass File Plant	3.7
Plant Frezar imeni Kalinin, Moscow	3.3
Plant Voykov, Zaporozh'ye	2.9
Plant Kalibr, Moscow	3.1
Moscow Instrument Plant	1.9
Tube Steel (sic)	5.2
Other Consumers	20.5
	100.0 46/

Reconstruction Period and At Present. The following items concern the distribution of products by Zaporozh'ye: In December 1947 the motor car industry was receiving thin sheet steel from Zaporozh'ye. In December 1949, 30 percent of the coke produced was shipped out of the plant and 70 percent was consumed by the Combine; 30 percent of the pig iron produced was shipped by rail to East Germany and 70 percent was consumed in the plant; and 35 percent of the steel produced was shipped by rail to East Germany, 30 percent was shipped to a tank plant near Moscow, and the balance was used in the Combine. At some time during 1950, Zaporozh'ye received an order for 460 MT of sheet steel for the manufacture of freight loading machines for Kuybyshev GES. In September 1950 the Combine received an order to roll steel sheets for the Leningrad Plant imeni Kirov, which was producing hoisting machines for the Kuybyshev and Stalingrad power projects. In July 1951, Zaporozh'ye made, ahead of schedule, the last shipment of extra-wide sheets to the Kuybyshev Hydroelectric Construction Project. 47/

l. Plant Efficiency.

In July 1948 the thin sheet department was awarded the Red Challenge Banner and the title of the "best rolling department of the country."

In November 1949, Zaporozh'ye, in answer to a Moscow appeal for better use of production reserves, planned to increase the output of steel in the existing open-hearth furnaces by 13 percent as a result of improved technology, particularly by the use of oxygen in the smelting process. On 30 December 1949 it was announced that Zaporozh'ye has completed the 1949 plan for the entire metallurgical cycle and had exceeded the prewar level of production in every phase of the cycle.

Production in all departments began to lag during late 1949; and in the first quarter of 1950, planned production for pig iron, steel, and rolled products was not met. The director of the plant was criticized severely.

In August 1951 the open-hearth shop at Zaporozh'ye was awarded the first prize and the title of the "best steel smelting shop in the Soviet Union" for results achieved during the first half of 1951. It was claimed that the plant produced thousands of tons of steel above the plan and performed over 900 high speed smelting processes in the first 6 months of 1951. In November 1952 it was announced that the Combine had completed its 11-month plan for steel and rolled products. 48/

m. Administration.

The Combine operated under the direction of the Ministry of Ferrous Metallurgy. 49/

n. Personnel.

Number of Workers. It is estimated that between 25,000 and 35,000 workers are employed at Zaporozh'ye on 3 8-hour shifts. 50/

Administrative Personnel. The following individuals held administrative positions at Zaporozh'ye on the dates given. Director of Zaporozh'ye Metallurgical Combine: October 1947 and February 1948, A.N. Kuzmin; May 1950, June 1951, and July 1953, (fnu) Boborykin (also spelled Babarykin). Director of Reconstruction at Zaporozh'ye: October 1947 and February 1948, V.E. Dymshits. Chief Engineer: July 1947, (fnu) Pudikov. Chief of Blast Furnace Division: July 1947, V.P. Shcherbakov. Chief of Wide Strip Mill: March 1952, (fnu) Lublin. Director of Ferroalloy Plant: October 1947 and July 1948, Ya. Dashevskiy. Director of Special Steel Plant: January 1951, Aleksandr F. Tregubenko. Secretary of Communist PartyCommittee: May 1950, (fnu) Konovalenko. 51/

o. Locational Characteristics. In November 1949 the north and south boundaries of the plant area were lined by a cinderblock wall approximately 1.5 m high, along which were spotted 10 steel towers approximately 40 m high, each of which was equipped with 4 floodlights. The plant was guarded by an estimated 200 uniformed guards, many of whom were women, and who were armed with carbines. Passes were required for admission to the plant area. 52/

V. Odessa Oblast: Odessa Complex.

The production of plants in Odessa Oblast is of only minor importance to the Soviet economy.

Summary of Estimated 1953 Production of Odessa Oblast

	Metallurgical Coke	Pig Iron	Steel	Finished Steel
Total Production (Thousand MT)	0	0	34.0	81.3
National Share (Percent)			Negligible	Negligible
Regional Share (Percent)			0.3	1.0

Summary Tables - Odessa Oblast: Odessa Complex.

48. Production and Capacity
October Revolution Agricultural Equipment Plant
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	0
Steel Production	
2 Converters	22.5
Rolling Mill Capacity	0
Finished Steel Production	15.0
Power Plant Capacity	N.A.

49. Production and Capacity
Odessa Rolling Mill imeni Dzerzhinski
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	0
Steel Production	0
Rolling Mill Capacity	
425/275-mm Bar Mill	N.A.
Universal Mill	N.A.
660-m Sheet Mill	N.A.
Finished Steel Production	60.0
Power Plant Capacity	N.A.

50. Production and Capacity
Odessa Wire and Nail Factory imeni A. Ivanov
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	0
Steel Production	0
Rolling Mill Capacity	N.A.
Finished Steel Production	N.A.
Power Plant Capacity	N.A.

51. Production and Capacity
Pervomaysk Metallurgical Plant imeni 25th Octyabr
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron	0
Steel Production	
1 OH	11.5
Rolling Mill Capacity	0
Finished Steel Production	6.3
Power Plant Capacity	N.A.

Plant Studies - Odessa Oblast: Odessa Complex.

25X1A2g

48. October Revolution Agricultural Equipment Plant. [redacted]

a. Location.

46° 29'N - 30° 44'E, Odessa, Odessa Oblast, Ukraine SSR. The plant site is bordered on the east by Odessa Bay and on the west by the Odessa-Moscow railroad. It lies approximately 2.5 km north of the Marti Shipyard, in the Northern section of Odessa. 1/

b. History and Development.

The October Revolution Plant produces farm machinery, principally plows. Until 1917 the plant was owned and operated by the German firm of SACHA, at which time it was taken over by the USSR, under which it continued to manufacture agricultural machinery. Some damage was suffered during World War II, but by mid-1949 reconstruction was completed. Some expansion has taken place in the intervening years which has resulted in increased production. 2/

c. Raw Materials and Other Inputs.

Pig iron for the Bessemer furnaces, sheet metals, and other semifinished steel products for the manufacturing divisions were reported to be shipped in by rail from the Krivoy Rog Dnepropetrovsk area. 3/

d. Coal and Coke.

The source of coal is unknown, but coke was reported to come by rail from the Donets Basin. 4/

e. Ironmaking Facilities.

There are two small cupolas for making cast iron in the foundry. 5/

f. Steelmaking Facilities.

Within the plant there is a foundry which produces steel castings. There are 2 1.5-ton Bessemer furnaces in operation. A third Bessemer installation was reported under construction in May 1949 by one prisoner of war; this may be in operation, but there is no confirmation. A new foundry building was completed in May 1949, but at that time no equipment had been installed. 6/

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

The plant contains a forge shop. 7/

i. Intraplant Services.

No information is available.

j. Products and Production.

Iron and steel products of the October Revolution Plant include iron and steel castings and forging. The plant has the capacity to produce 22,500 MT of Bessemer steel castings per year, this estimate being based on 25 heats per day, 300 days per year; but based on US foundry practice, production is estimated at approximately 15,000 MT.

k. Distribution.

All castings and forgings are believed to be used within the plant.

l. Plant Efficiency.

No information is available.

m. Administration.

No information is available.

n. Personnel.

In December 1950 it was estimated that 120 persons were employed on each shift in the foundry. Three shifts were worked each day. 8/

o. Locational Characteristics.

No information is available.

25X1A2g

49. Odessa Rolling Mill imeni Dzerzhinski. [redacted]

a. Location.

46° 30'N - 30 40'E, Odessa, Odessa Oblast, Ukraine SSR. The plant lies approximately 2 km northwest of the city and approximately 4 km west of the shore of the Black Sea, on the Odessa railroad line. 1/

b. History and Development.

The Odessa Rolling Mill was in operation before World War II, and estimates of war damage range from 30 percent to complete destruction. Restoration of facilities began early in 1946, and operation of the sheet mill was scheduled for June 1946.

In March 1946, plans were announced for the construction of an integrated steel mill at the rolling mill site. The planned blast furnace was scheduled for a capacity of 60,000 to 70,000 MT per year; 3 open-hearth furnaces were to be installed; a blooming mill was to be constructed, and also a wire mill, with a capacity of 30,000 MT. No information on the implementation of these plans is available. 2/

c. Raw Materials and Other Inputs.

Steel ingots are received from steel plants in Southern Russia. 3/

d. Coal and Coke.

No information is available.

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

In 1941 it was claimed that three open-hearth furnaces were in operation, and in March 1946 it was reported that plans for an open-hearth were in the final stages of development. It is possible that one open-hearth is in operation. 4/

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

In 1941, one small bar mill was in operation. It consisted of 1 roughing stand, 3 425-mm intermediate stands, and 5 275-mm finishing stands. The bar mill was reported back in operation in September 1947.

In June 1946 it was announced that a Universal mill would be placed in operation in the near future. 5/

A sheet mill went into production in 1932, which consisted of 5 660-mm stands. It was destroyed partially during World War II, restoration began in January 1946, and the mill resumed production in August 1946. 6/

i. Intraplant Services.

No information is available.

j. Products and Production.

Production of the Odessa Rolling Mill includes small bars, steel sheet, and roofing material. It is possible that some ingot steel is being produced.

Output of rolled products of the plant in 1934 was 37,000 MT and in 1935 59,300 MT; 1953 production probably did not exceed 60,000 MT. 7/

k. Distribution.

In June 1946 the plant loaded 280 MT of rolled steel for the needs of the transportation industry. In August 1951 the Odessa Rolling Mill received an order for 230,000 sheet iron tiles for roofing of houses in Stalingrad. The first consignment of 120,000 pieces was nearing completion. In February 1952 the mill shipped several carloads of roofing sheet to the Kakhovka Hydroelectric Power Plant. 8/

l. Plant Efficiency.

No information is available.

m. Administration.

The plant is believed to be under the direction of the Ministry of Ferrous Metallurgy.

n. Personnel.

In 1937, 5,000 persons were said to be employed at the plant. 9/ In June 1946 the director of the rolling mill was reported to be (fnu) Khomenko; in July 1948 the director was (fnu) Kuz'min. 10/

o. Locational Characteristics.

In September 1947 the plant was surrounded by a brick wall 2 m high, topped by barbed wire. There were wooden observation towers in which were mounted searchlights in all corners of the fence. The plant was guarded by civilian watchmen. 11/

25X1A2g

50. Odessa Wire and Nail Factory imeni A. Ivanov. [redacted]

a. Location.

46° 29'N - 30° 44'E, Odessa, Odessa Oblast, Ukraine SSR. The plant site is adjacent to the Odessa railroad line. 1/

b. History and Development.

The Odessa Wire and Nail Factory was in operation in 1924. 2/

c. Raw Materials and Other Inputs.

No information is available.

d. Coal and Coke.

No information is available.

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

None.

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

There are machines for making nails and wire drawing equipment in the plant. 3/

i. Intraplant Services.

No information is available.

j. Products and Production.

Nails and wire are produced. 4/

k. Distribution of Products.

No information is available.

l. Plant Efficiency.

No information is available.

m. Administration.

No information is available.

n. Personnel.

In May 1945 the director of the plant was Kh. Piryatinskiy.

o. Locational Characteristics.

No information is available.

51. Pervomaysk Metallurgical Plant imeni 25th Oktyabr (Pervomaysk Agricultural Machinery Plant). [redacted] 25X1A2g

a. Location.

46° 29'N - 30° 44'E, Odessa, Odessa Oblast, Ukraine SSR. The plant is located approximately 1 km from the Odessa railroad station. 1/

b. History and Development.

The Pervomaysk Metallurgical Plant, which manufactures agricultural equipment, such as harvesters, mowers, diesel engines, and cranes, was placed in operation in 1875. The plant was almost completely destroyed during World War II. Restoration was claimed to be rapid, because of the use of prisoners of war and the installation of captured equipment. 2/

c. Raw Materials and Other Inputs.

No information is available.

d. Coal and Coke.

No information is available.

e. Ironmaking Facilities.

There are no blast furnaces at the plant, but there are an unknown number of cupola furnaces.

In 1951 it was announced that a new method had been developed at Pervomaysk for producing thin metal sheet for roofing material directly from liquid cast iron. The liquid iron is poured directly from the ladle between the rollers, which form the sheet while the metal is cooling. The finished sheets are annealed. It was claimed that 1 installation could produce 5,000 sq m* of sheet, from 0.5 to 0.6 m thick, and that the cost was 50 percent below that of sheet steel. 3/

f. Steelmaking Facilities.

One small open-hearth furnace with a hearth area of 7.9 sq m produces steel for castings. Using an estimated steel coefficient of 4.5, 1952 production is estimated at 11,500 MT. 4/ No increase is estimated for 1953.

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

None.

i. Intraplant Services.

No information is available.

j. Products and Production.

Cast iron roofing material is produced. All steel produced is for making steel castings. 1952 and 1953 production of steel is estimated at 11,500 MT and that of castings, using a 55 percent yield, at 6,300 MT.

k. Distribution of Products.

No information is available.

l. Plant Efficiency.

No information is available.

* Period of time is not known.

m. Administration.

Direction of the plant has changed several times. In April 1940 the plant was operated under the direction of the Peoples' Commissariat of Heavy Machinery Building. In March 1945 it was claimed to have been administered by the Peoples' Commissariat of Medium Industry, and in September 1951 it was announced that the plant was under the administration of the Ministry of Agricultural Machinery Production. 5/

n. Personnel.

In 1951 Ye. Nikolayenko was an engineer in the plant. 6/

o. Locational Characteristics.

No information is available.

VI. Nikolayev Oblast: Nikolayev Complex.

Production of iron and steel plants in Nikolayev Oblast is of insignificant importance to the Soviet economy.

Summary of Estimated 1953 Production of Nikolayev Oblast

	Metallurgical Coke	Pig Iron	Steel	Finished Steel
Total Production (Thousand MT)	0	0	138.0	75.0
National Share (Percent)			Negligible	Negligible
Regional Share (Percent)			1.2	0.9

Summary Tables - Nikolayev Oblast: Nikolayev Complex.

52. Production and Capacity
Dormashina Tractor Plant
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	0
Steel Production	
1 Electric	3.0
Rolling Mill Capacity	0
Finished Steel Production	N.A.
Power Plant Capacity	N.A.

53. Production and Capacity
Marti Shipbuilding Yard No. 444
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	0
Steel Production	
3 OH's, 2 Converters, and 1 Electric	135.0
Rolling Mill Capacity	N.A.
Finished Steel Production	75.0
Power Plant Capacity	N.A.

Plant Studies - Nikolayev Oblast: Nikolayev Complex.

52. Dormashina Tractor Plant. [redacted]

a. Location.

46° 58'N - 32° 00'E, Nikolayev, Nikolayev Oblast, Ukraine SSR. The tractor plant is located in the center of Nikolayev.

b. History and Development.

The Dormashina Tractor Plant, which produced caterpillar tractors for road construction, dredges, farm machinery, and weapons carriers, was in existence before World War II. 1/

c. Raw Material and Other Inputs.

No information is available.

d. Coal and Coke.

No information is available.

e. Ironmaking Facilities.

Three melting furnaces were seen by prisoners of war in the iron and steel foundry. It is believed that two of these were cupolas for the making of iron castings. 2/ There is no information on size.

f. Steelmaking Facilities.

Three melting furnaces were seen by prisoners of war, and it is believed that 1 of these was a 3-ton electric furnace for the making of steel castings. 3/

1952 electric steel production is estimated at 3,000 MT.

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

None.

i. Intraplant Services.

No information is available.

j. Products and Production.

Iron and steel castings are made, but the amounts are not known.

Electric steel production for 1953 is estimated at 3,000 MT.

k. Distribution of Products.

No information is available.

l. Plant Efficiency.

No information is available.

m. Administration.

No information is available.

n. Personnel.

No information is available.

o. Locational Characteristics.

In December 1948 the plant was partly enclosed by a barbed wire fence approximately 2.5 m high, and was guarded by industrial police. 4/

53. Marti Shipbuilding Yard No. 444 imeni Andre Marti (Southern Shipbuilding Yard). [redacted] 25X1A2g

a. Location.

46° 56'N - 31° 58'E, Nikolayev, Nikolayev Oblast, Ukraine SSR. The shipyard is located on the northern bank of the Yuzhnny Bug River, southwest of the city of Nikolayev. 1/

b. History and Development.

Marti is the largest shipyard in the Black Sea area and the second largest in the USSR. It has the capacity to build all types of naval and commercial vessels, from small submarines and barges to battleships and ocean-going liners. It was constructed originally in 1896-99. The iron and steel industry is well represented in the shipyard, in which there is an open-hearth shop, as well as extensive steel foundries, forge shops, and an iron foundry. The yard was damaged considerably during World War II. Equipment was removed, and most of the buildings were burned out. Reconstruction started in mid-1944, and the plant was estimated as complete in late 1949. 2/

c. Raw Materials and Other Inputs.

Prewar. Raw material for the steel melting and casting shops came from various sources. Iron ore was received from mines in Krivoy Rog. Chrome ore came from the Urals in small quantities. Limestone was received from Sebino; dolomite, from Dolmitnaya in the Donets Basin; bauxite, from Tikhvin near Leningrad; and dinas and chamotte refractory brick, from the Donets Basin. Magnesite and chromium magnesite brick came from Sadka in the Urals; fuel oil, from Kherson and Tuapse; pig iron, from the steel plants in the Donets Basin; scrap iron and steel, from the southern Ukraine, foundry pig iron, from plants in the Ukraine; and ferroalloys, from the Zaporozh'ye ferroalloy plant. 3/

At Present. Sources of raw materials are not known.

d. Coal and Coke.

In the prewar years, coal and coke were shipped in by rail and by boat from the Donets Basin. 4/ Present sources are believed to be the same.

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

Prewar. The open-hearth shop was built early in the 1900's and consisted of three oil-fired furnaces. No. 1 had a hearth area of 7.22 sq m, No. 2 had 20 sq m, and No. 3 had 32.9 sq m. Space was available for a fourth open-hearth furnace. There were 2 small Bessemer converters which had a total capacity of 5.4 MT.

The casting house for raw and forge steel ingots was parallel to and adjoining the furnace plant. Four sections of the steel-casting department adjoined the casting house. Mixing machines for molding sand and clay, and the sand dump, and the like, were next in line. The tracks over which the scrap metal was carried were located on the other side of the furnace house and were connected with the charging platform, which was equipped with a charging crane. A storehouse for fireproof materials and a boilerhouse were located behind the tracks. The forge and dolomite installations were at the western end of the steel mill. The ingot mold storage section adjoined these. To the east and adjoining the steel casting department were the repair shops of the steel mill, the electric welding shop for castings, and the dressing shop for rough castings.

Ingot production was estimated at approximately 70,000 MT per year, of which approximately 10 percent was used in the shipyard and the balance shipped out to other consumers.

Metric Tons

Use	Total Amount Produced	Amount Consumed	Amount Shipped
Forgings	18,000	2,500	15,500
Axle Steel	6,000		6,000
Tube Billets	36,000		36,000
Steel Castings	10,000	3,500	6,500
Total	70,000	6,000	64,000

Tube billets were shipped to Leningrad, Izhevsk, and Taganrog. Forgings were sent to Leningrad.

There was a small 3-ton electric furnace in the steel mill.

Steel-Casting Foundry. There were 6 drying furnaces for molds and cores, 1 coal-fired drying furnace for clay, and 2 portable drying furnaces. The dressing department contained 2 large and 2 small oil-fired, annealing furnaces for castings. The maximum weight for a single casting was 60 MT. Approximately 800 MT of castings were produced each month, which included ships' fittings and parts of ships' hulls, such as stern posts, stem, steering frames, rudder, propellers, and bearing brackets. Steel castings were shipped to all shipyards in the USSR, particularly to Leningrad.

Cast Iron Foundry. The cast iron foundry, though out of date, operated efficiently and was scheduled to be modernized. It contained 1 large furnace for metal casting, 3 cupolas, 2 electric furnaces, and several reverberatory furnaces.

Wood Pattern Shop. This shop served both the steel and iron foundries.

Press and Hammer Mill. The shop contained a small forge with 7 hammers, a large forge with 12 hammers, and a press mill with 1 3,000-ton hydraulic steam press and 1 900-ton hydraulic steam press. 5/

At Present. In June 1945 it was announced that the damaged furnaces of the open-hearth shop had been repaired and were ready to start operation. A number of prisoner-of-war reports were made on the shop, but no two agreed on descriptions of the furnaces. 6/ It is believed that 3 open-hearth furnaces with capacities of approximately 5, 25, and 50 MT, 2 Bessemers, and 1 small electric furnace are in operation at the present time, and that they are approximately the same size as those which were in operation before World War II.

Estimated 1952 Open-Hearth Steel Production at Marti*

Open-Hearth Number	Hearth Area (Sq M)	Coefficient	Operating Days	Production (Thousand MT)
1	7.22	4.5	325	10.5
2	20.0	4.5	325	29.3
3	32.9	4.5	325	48.1
	Total Open-Hearth Steel Production			87.9

Estimated 1952 Bessemer Steel Production at Marti

Bessemer Number	Capacity (MT)	Number of Heats per Day	Operating Days	(Thousand MT)
1)) 2)	5.4	25	300	40.5

Estimated 1953 Open-Hearth Steel Production at Marti*

Open-Hearth Number	Hearth Area (Sq M)	Coefficient	Operating Days	Production (Thousand MT)
1	7.22	4.7	325	11.0
2	20.0	4.7	325	30.5
3	32.9	4.7	325	50.2
	Total Open-Hearth Steel Production			91.7

* See Appendix C, Methodology, for use of coefficient in estimating production.

Estimated 1953 Bessemer Steel Production at Marti

Bessemer Number	Capacity (MT)	Number of Heats per Day	Operating Days	Production (Thousand MT)
1)) 2)	5.4	25	300	40.5

No estimate of electric furnace production can be made without some indication of the size of the furnace.

Total 1952 steel production is estimated to be approximately 130,000 MT. Total 1953 steel production is estimated at approximately 135,000 MT.

g. Primary Rolling Facilities.

No information on the rolling mills at Marti is available. Since over half of the prewar production of the steel mill was reported to be tubing billets, all of which were shipped out of the plant, some rolling facilities existed.

h. Finishing Rolling Facilities.

None.

i. Intraplant Services.

See Steelmaking Facilities, above. No other information on intraplant services for the steel mill is available.

j. Products and Production.

The steel plant of the Marti Shipyard produces open-hearth steel, Bessemer steel, special steel, steel castings of parts for ships -- such as fittings, stern posts, steering frames, rudders, propellers, bearing brackets, and so on -- iron castings, and forgings. Open-hearth steel production in 1953 is estimated at 91,700 MT, Bessemer production is estimated at 40,500 MT, and no estimate of electric steel production can be made. Production of forgings and castings is estimated at 70,000 to 75,000 MT per year.

k. Distribution of Products.

There is no information on the postwar distribution of products by Marti. Before World War II, approximately 10 percent of the steel produced was used within the shipyard, and the balance was shipped out to other consumers.

l. Plant Efficiency.

No information is available.

m. Administration.

Operation of the plant is under the direction of the Ministry of the Shipbuilding Industry. 7/

n. Personnel.

No information is available.

o. Locational Characteristics.

No information is available.

VII. Khar'kov Oblast; Khar'kov Complex.

Iron and steel production of Khar'kov Oblast is of little significance in the Soviet economy.

Summary of Estimated 1953 Production of Khar'kov Oblast

	Metallurgical Coke	Pig Iron	Steel	Finished Steel
Total Production (Thousand MT)	N.A.	0	65.7	36.1
National Share (Percent)	Negligible		Negligible	Negligible
Regional Share (Percent)	Negligible		0.5	0.4

Summary Tables - Khar'kov Oblast: Khar'kov Complex.

54. Production and Capacity
Khar'kov Experimental Coke-Chemical Plant No. 26
1953

	Thousand Metric Tons
Metallurgical Coke Production	
1 Battery and 10 Ovens	N.A.
Pig Iron Production	0
Steel Production	0
Rolling Mill Capacity	0
Finished Steel Production	0
Power Plant Capacity	N.A.

55. Production and Capacity
Khar'kov Locomotive and Tank Plant imeni Komintern
1953

	Thousand Metric Tons
Metallurgical Coke Production	0
Pig Iron Production	0
Steel Production	
3 OH's and 1 Electric	65.7
Rolling Mill Capacity	0
Finished Steel Production	36.1
Power Plant Capacity	N.A.

Plant Studies - Khar'kov Oblast: Khar'kov Complex.

54. Khar'kov Experimental Coke-Chemical Plant No. 26 (Khar'kov-Oznovo Coke-Chemical Plant). [redacted] 25X1A2g

a. Location.

49° 56'N - 36° 12'E, Khar'kov, Khar'kov Oblast, Ukraine SSR. The plant lies approximately 3 km south of the Khar'kov-Levada railroad station. 2/

b. History and Development.

The Khar'kov Experimental Coke-Chemical Plant, which conducts research on the coking of various types of Soviet coal and which tests new designs and developments in equipment for coke-chemical production, was in operation before 1939. 3/

c. Raw Materials and Other Inputs.

No information is available.

d. Coal and Coke.

Coal. Coal for experimental purposes is probably received from all parts of the USSR. 4/

Coke. Before World War II, Khar'kov had 1 battery of 10 coke ovens, which had a total volume of 199 cu m. In November 1947 it was announced that workers of Giprokoks had created a new design for coke ovens, the Giprokoks System, which had been installed at Khar'kov and which had received a good rating in the tests. In 1950, in addition to coke ovens, the installation contained ammonia washers, tar extractors, and sulfur removal beds. 5/

No further information is available on the present installations and capacities of the plant.

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

None.

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

None.

i. Intraplant Services.

No information is available.

j. Products and Production.

70,000 MT of metallurgical coke were produced in 1939. 6/

k. Distribution of Products.

No information is available.

l. Plant Efficiency.

It was announced that the Khar'kov Coke-Chemical Plant had overfulfilled its 1945 production plan by 5,000 MT of high quality metallurgical coke.

In 1953 a complaint appeared in the press that tens of millions of cu m of high caloric gas were carried off into the atmosphere; this gas, with a small capital outlay, could be used in the city economy of Khar'kov.

m. Administration.

No information is available.

n. Personnel.

No information is available.

o. Locational Characteristics.

No information is available.

55. Khar'kov Locomotive and Tank Plant imeni Komintern (Khar'kov Machine Building Factory, KHZTM Machine Building Factory; Railroad Locomotive Plant). [redacted] 25X1A2g

a. Location.

49° 56'N - 36° 12'E, Khar'kov, Khar'kov Oblast, Ukraine SSR.

b. History and Development.

The Khar'kov Locomotive and Tank Plant was in existence before World War II and suffered some damage during hostilities. Reconstruction began shortly after the USSR recaptured the Ukraine, and it is believed that the plant is in full production, manufacturing tanks, tractors, locomotives, and heavy machinery.

c. Raw Materials and Other Inputs.

No information is available.

d. Coal and Coke.

No information is available.

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

There were three open-hearth furnaces in operation at Khar'kov in the early 1930's. No. 3 furnace was commissioned in December 1932 with an announced hearth area of 14 sq m. The three furnaces were located in the steel and gray iron foundry of the plant. The foundry sustained some damage during World War II. In October 1943 the announcement was made that it had been placed back in operation. Prisoners of war claimed that three small open hearths were operating in the plant in March 1948. 1/ In July 1947 a prisoner of war reported that a small electric furnace was in production. 2/

Estimated Open-Hearth Steel Production at Khar'kov
1952

Open Hearth Number	Hearth Area (Sq M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
1	14.0	4.5	325	20.5
1	14.0	4.5	325	20.5
1	14.0	4.5	325	20.5
Total Open-Hearth Steel Production				61.5
Estimated 1952 Electric Steel Production				1.5
Estimated 1952 Steel Production				63.0

Estimated Open-Hearth Steel Production at Khar'kov
1953

Open-Hearth Number	Hearth Area (Sq M)	Estimated Coefficient	Operating Days	Production (Thousand MT)
1	14.0	4.7	325	21.4
1	14.0	4.7	325	21.4
1	14.0	4.7	325	21.4
	Total Open-Hearth Steel Production			64.2
	Estimated 1953 Electric Steel Production			1.5
	Estimated 1953 Steel Production			65.7 3/

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

None.

i. Intraplant Services.

No information is available.

j. Products and Production.

The steel produced is used in the output of steel forgings and castings Total steel production for 1952 is estimated at 62,500 MT, and for 1953 at 65,700 MT.

k. Distribution.

All steel produced is probably used in the production of castings and forgings at the Khar'kov plant.

l. Plant Efficiency.

No information is available.

m. Administration.

In 1944 the plant was operated under the supervision of the Chief Directorate of the Tank Industry. 4/

n. Personnel.

No information is available.

o. Locational Characteristics.

No information is available.

VIII. Crimea Oblast: Kerch' Complex.

Except for the production of metallurgical coke, the production of Crimea Oblast is of little importance to the Soviet economy.

Summary of Estimated 1953 Production of Crimea Oblast

	Metallurgical Coke	Pig Iron	Steel	Finished Steel
Total Production (Thousand MT)	975.0			N.A.
National Share (Percent)	2.7			Negligible
Regional Share (Percent)	5.4			Negligible

Summary Tables - Crimea Oblast: Kerch' Complex.

56. Production and Capacity
Kerch' Coke-Chemical Plant imeni Kirov
1953

	Thousand Metric Tons
Metallurgical Coke Production	
1 Battery and 55 Ovens	275.0
Pig Iron Production	0
Steel Production	0
Rolling Mill Capacity	0
Finished Steel Production	0
Power Plant Capacity	N.A.

57. Production and Capacity
Kerch' Metallurgical Plant imeni Voykov
1953

	Thousand Metric Tons
Metallurgical Coke Production	
2 Batteries and 110 Ovens	700.0
Pig Iron Production	0
Steel Production	0
Rolling Mill Capacity	
Blooming Mill	N.A.
Finishing Mill	N.A.
Finished Steel Production	N.A.
Power Plant Capacity	N.A.

Plant Studies - Crimea Oblast: Kirch' Complex. 25X1A2g

56. Kerch' Coke-Chemical Plant imeni Kirov. [redacted]

a. Location.

45° 21'N - 36° 32'E, Kerch', Crimea Oblast, Ukraine SSR. The coke-chemical plant is situated in the northeast section of the city, close to the main railroad station.

b. History and Development.

The plant was in operation before World War II. Four batteries, which were not equipped for the recovery of byproducts, were reported to have been placed in operation in 1886, and a fifth battery, from which byproducts were recovered, went into production in 1929. Some damage was sustained during World War II, and in 1948 it was announced that reconstruction was under way and that it would be completed in 1950. 1/

c. Raw Materials and Other Inputs.

No information is available.

d. Coal and Coke.

Coal. Coal comes from the Kerch' Peninsula. 2/

Coke. Before World War II the Kerch' Coke-Chemical Plant consisted of the following: Four batteries with a total of 200 Koppe- (Coppee) type coke ovens, each of which had a useful volume of 5.7 cu m -- these batteries were not equipped for the recovery of by-products -- and one battery with a total of 55 Becker-type ovens, each of which had a useful volume of 20.7 cu m. 3/

Restoration of Kerch' facilities was under way in 1948 and scheduled for completion in 1950. 4/

In 1949 an article appeared which described operations at Kerch' as follows:

"The first industrial installation for utilizing heat from dry slaking coke was made at the Kerch Coke-Chemical where it worked until 1941. In consisted of two compartments for dry slaking coke and four flue compartments which generated 3.5 tons of steam per hour at a pressure of 14 atm. White-hot coke, loaded into the coke-slaking compartment at a temperature of 850° to 950°C was cooled there to 250° to 275° C. The gas, passing through a layer of coke, is heated to 550° to 700° C and is then cooled in the boiler to 170° to 200° C.

"According to data obtained from experiments carried out by the Scientific Research Gas Institute, the specific yield of steam is approximately 400 kg for every ton of coke loaded into the compartment.

"Dry slaking of coke has the following advantages over the damp method: (1) obtaining steam suitable for power purposes, (2) decreasing the waste of small coke and increasing the yield of large coke, (3) abolition of coke-tunnel water supply arrangements, and (4) improvement of the hygienic conditions of labor.

"The renewal of experimental work in this direction is of great interest." 5/

It is not believed that the four batteries of Koppe (Coppee) ovens were ever rebuilt after World War II. Since the war the demand for metallurgical coke in the area has decreased. The only iron and steel plant in the vicinity, the Kerch' Metallurgical Plant imeni Voykov, was severely damaged during the war, and it is not believed that the blast furnaces and open hearths were restored. It is believed that only the Becker-type coke battery of 55 ovens was restored at the Kerch' Coke-Chemical Plant. 6/

e. Ironmaking Facilities.

None.

f. Steelmaking Facilities.

None.

g. Primary Rolling Facilities.

None.

h. Finishing Rolling Facilities.

None.

i. Intraplant Services.

No information is available.

j. Products and Production.

Metallurgical coke, benzene, toluene, crude tar, and ammonium sulfate are produced. Metallurgical coke production in 1952 is estimated at 275,000 MT. No increase is estimated for 1953.

k. Distribution.

No information is available.

l. Plant Efficiency.

No information is available.

m. Administration.

The plant probably operates under the direction of the Ministry of the Chemical Industry.

n. Personnel.

No information is available.

o. Locational Characteristics.

No information is available.

25X1A2g

57. Kerch' Metallurgical Plant imeni Voykov (Voikov). [redacted]

a. Location.

45° 21'13"N - 36° 32'50"E, Kerch', Crimea Oblast, Ukraine SSR. The plant is located northeast of Kerch'. The main Stalino railroad line serves the mill, and there are dock facilities on the Sea of Azov. 1/

b. History and Development.

Construction of the Kerch' plant was begun under the Czarist regime. The plant stood idle after 1903. In 1912 the installation was acquired by the Taganrog Metallurgical Corporation, which modernized and expanded the plant during the years 1929-35. It was claimed that the plant was 70 percent destroyed during World War II. Reconstruction began in 1944 and progressed slowly. Completion of restoration of the mill was scheduled for the end of 1950.

Before World War II the Kerch' Metallurgical Plant was the only mill in the USSR which produced Thomas steel. 2/

On the basis of the information available it is not believed that the ironmaking and steelmaking facilities of the plant were ever placed back in production after World War II. In 1947, however, plans were announced that the old blast furnaces would be replaced with new modern furnaces. Some rolling facilities are estimated to be in production, operating on steel shipped into the plant from other metallurgical plants in the Ukraine.

Approved For Release 1999/09/02 : CIA-RDP79-01093A000600010003-9

c. Raw Materials and Other Inputs.

There is no information on present sources of raw materials. Before the war 70 percent of the plant's iron ore requirements came from the Kamysh-Burun mines nearby, and 30 percent came from Krivoy Rog. Limestone came from Novorossiysk. 3/

d. Coal and Coke.

Coal. Before the war Donets Basin coal was shipped by boat from Rostov. 4/

Coke. Kerch' has its own coke-chemical plant. The following estimate of the 1952 capacities was made by an authoritative source:

Number and Type of Batteries	2 Becker
Number of Ovens	110
Volume of Ovens (cu m)	20.8
Width of Oven (mm)	406
Normal Coking Time (hours)	16
Coal Charge per Oven, Dry Basis (MT)	15.5
Total Daily Carbonization Capacity (MT)	2,558
Total Annual Carbonization Capacity (MT)	920,880
Annual Coke Capacity, Dry Basis (MT)	699,869
Annual Coke Capacity, Moist Basis (MT)	720,000
Refined Benzene Capacity (MT per year)	5,830
Refined Toluene Capacity (MT per year)	1,368
Crude Tar Capacity (MT per year)	27,036
Ammonium Sulfate Capacity (MT per year)	9,569 5/

e. Ironmaking Facilities.

Three blast furnaces were built at Kerch' during 1929-30. Blast furnace No. 1 had a working volume of 615 cu m, No. 2 had 629 cu m, and No. 3 had 698 cu m. After some modifications which were made in the years just before World War II, dimensions were as follows:

Number of Furnace	Working Volume (cu m)	Diameter (mm)			
		Hearth	Bosh	Stockline	Large Bell
1	602	5,300	6,600	5,000	3,600
2	602	5,300	6,600	5,000	3,600
3	703	6,000	7,000	5,150	3,600

Raw Material Consumption of Pig Iron

Kg per MT

	1930	1931	1932	1933	1934	1935	1936
Coke	1,245	1,195	1,171	1,239	1,112	1,158	1,172
Iron Ore	2,169	2,197	2,081	2,143	1,196	2,064	1,895
Limestone	933	795	777	794	754	770	648

A sintering plant for processing Kamysh-Burun iron ores was placed in operation in 1929. The present status is not known.

In 1947 it was claimed that instead of repairing the old blast furnaces, it had been decided to replace them with completely new, fully mechanized blast furnaces of American design, and that construction had been started. 6/ It is not believed that the blast furnaces are in production.

f. Steelmaking Facilities.

Before World War II there were 4 open-hearth furnaces with a combined yearly capacity of approximately 165,000 MT, and 5 Thomas converters, with a capacity of 25 MT each and a combined yearly capacity of 125,000 MT. War damage is unknown. It is not believed that either the open hearths or the Thomas converters are in operation at the present time. 7/

g. Primary Rolling Facilities.

In the prewar years, a blooming mill with roll diameters of 1,150 mm was in operation at Kerch'. In 1946 it was announced that a newly constructed blooming mill had been placed in operation. 8/

h. Finishing Rolling Facilities.

Before World War II, a rail and girder rolling mill, consisting of 3 stands, with roll diameters of 850 mm, was in operation. There is no information as to the present status of the mill, but it is estimated that some finishing facilities are in operation. 9/

i. Intraplant Services.

A slag plant was in operation in July 1941. 10/ In 1934, Kerch' had its own electric power plant, the capacity of which was more than 25,000 kw. 11/

j. Products and Production.

Products. Before the war the steel combine produced coke, pig iron, Thomas steel, open-hearth steel, rods, rails, plate, and parts for the construction industry. In April 1946 it was announced that new Strellya boilers were being turned out at the plant. No later or more complete information is available. 12/

Production.

Production of Kerch' Metallurgical Plant
1934-40

Thousand Metric Tons

	1934 13/	1935 13/	1936 14/	1939 15/	1940 16/
Pig Iron	326.2	436.9	441.6	476.0	120.0
Steel	203.7	245.8	291.6	360.0	300.0
Finished Steel	173.0	213.6	261.6	330.0	240.0

k. Distribution.

No information is available.

l. Plant Efficiency.

No information is available.

m. Administration.

Kerch' operates under the direction of the Ministry of Ferrous Metallurgy.

n. Personnel.

No information is available.

o. Locational Characteristics.

No information is available.

APPENDIX A

METHODOLOGY

It was necessary to establish a methodology governing such details as the actual existence of an installation; blast furnace production; steel production by open-hearth furnaces, electric furnaces, and Bessemer converters; duplex steel production; and finished steel output.

If there was firm information from a reliable source on the existence of a plant in the postwar period, the plant was carried in the study. The only exceptions to this rule are the inclusion of the Dneprodzerzhinsk Coke-Chemical Plant, imeni Kamen, the Irmino Coke-Chemical Plant, and the Khar'kov Experimental Coke-Chemical Plant No. 16. It is probable that all three plants are in operation.

Blast furnace coefficients of utilization were generally available through 1952, with some available for 1953. The USSR uses the term coefficient as applied to blast furnaces in a sense different from its usual connotation. This is further explained in the sample calculation outlined below. Production estimates for 1952 and 1953 were based on the developing pattern of furnace performance. The number of operating days of a furnace per year was established at 340. The following sample computation illustrates the method of estimating annual pig iron production from a blast furnace:

$$\frac{A}{B} \times C = \text{yearly production.}$$

A is the volume of the blast furnace in cubic meters, B is the coefficient of utilization with dimensions in cubic meters of furnace volume used per MT of pig iron production per 24-hour period, and C is 340, the number of operating days per year.

Open-hearth furnace areas and coefficients of utilization were generally available for 1952, with a few reported for 1953. Production estimates for 1952 and 1953 were based on the Soviet pattern of furnace performance. The number of operating days of an open-hearth furnace per year was established at 325. The following sample computation shows the method of obtaining annual steel production from an open-hearth furnace:

$$A \times B \times C = \text{yearly production.}$$

A is the hearth area in square meters, B is the coefficient of utilization with dimensions of MT of steel produced per square meter of hearth area per 24-hour period, and C is 325, the number of operating days per year.

Electric furnace steel production is based on a factor of 1,000 MT of steel annually per MT of furnace capacity. Experience has shown this factor to be consistently within reason, although production from various types of electric furnace operations fluctuates widely.

Bessemer steel production is based on 25 heats per day per converter for 300 operating days per year. The sample computation below shows the method of obtaining annual Bessemer steel production from a converter.

$$A \times B \times C = \text{yearly production.}$$

A is the rated capacity of the converter in MT, B is the 25 heats per 24-hour period, and C is 300, the number of operating days per year.

The amount of finished steel produced was estimated on the basis of an average yield of the specific product from the ingot. When the product mix was unknown or when it consisted of many products, a yield of 72 percent was used. When the product mix was known or was limited to a single product, a yield was used which was consistent with US practices. Such yields are specified in the production table of each plant.

APPENDIX B

GAPS IN INTELLIGENCE

Prewar information on iron and steel plants in Region III was reliable and fairly complete and provided a firm basis on which the thousands of prisoner-of-war reports on the area could be interpreted. In the preparation of individual plant studies some major omissions were noted that were common to all. Among these more important gaps are: (1) sources and inputs of raw materials; (2) recent coefficients of the operation of blast furnaces and open-hearth furnaces; (3) reliable information on finishing facilities; (4) information on the distribution of steel mill products to consuming industries; and (5) firm information on numbers of employees.

There are some important gaps in information on individual plants:

1. Confirmation is needed on the operation of the Dneprodzerzhinsk Coke-Chemical Plant imeni Kamen.

2. It is not known whether the two blast furnaces at Dnepropetrovsk Metallurgical Equipment Plant DZMO were ever rebuilt.

3. The sizes of the two blast furnaces at Il'ich Steel Plant are not known.

4. Confirmation is needed on the operation of the Irmino Coke-Chemical Plant which was built in 1936.

5. It is important to know how many of the four coke batteries in operation at the Kerch' Coke-Chemical Plant imeni Kirov have been rebuilt.

6. There were no prisoners of war assigned to the Kerch' Metallurgical Plant imeni Voykov during the reconstruction period, and it is not known whether the 5 Thomas converters, 3 blast furnaces, and 4 open-hearth furnaces were ever rebuilt.

7. There is no postwar information on finishing facilities at the Khartsyzsk Pipe Plant.

8. Information is available on only 1 of the 2 coke batteries which were in operation at the Konstantinovko Coke-Chemical Plant No. 17.

9. The size of the electric furnaces and the existence of a primary rolling mill at Marti Shipbuilding Yard are unknown.

10. The number of coke batteries in operation at the Mushketovo Coke-Chemical Plant No. 9 is unknown.

11. No information on the Odessa Wire and Nail Factory imeni A. Ivanov is available after May 1945.

12. Only one 1948 reference is available on the Shcherbinovka Coke-Chemical Plant No. 11.

13. There is no information on the 7 open-hearth furnaces, 2 Bessemer converters, blooming mill, and 5 bar mills which were in operation before World War II at the Voroshilovsk Metallurgical Works imeni Voroshilov.

14. Two postwar press releases on two coke plants were noted, Fenolnaya Coke-Chemical Plant at Fenolnaya and Yekaterinovsk Coke Plant at Khanzhenkovo. Both plants were supposed to have been in operation before World War II, but there is no information available on the number and size of batteries at the present time.

APPENDIX C

SOURCES AND EVALUATION OF SOURCES

1. Evaluation of Sources.

a. German Intelligence Reports.

Information from these sources was excellent and was substantiated for the most part by other sources. A report on plants in the Dnepr Bend region of the Ukraine was prepared by a group of German engineers who surveyed the installations after the German army overran the area. These German Intelligence Reports proved invaluable in furnishing accurate prewar descriptions of plants and their equipment and production.

b. Prisoner-of-War Reports.

With few exceptions, every plant in the Ukraine was restored with the aid of prisoners of war. Reports of these prisoners on some of the larger plants ran into the thousands and covered developments in the area up to the end of 1949. Many of these numerous reports were useless, but those obtained from men who had had technical education, training, and experience were invaluable and served both as a check on the German Intelligence Reports and as a source of information on the progress made in rebuilding Ukrainian steel plants and equipment in the postwar reconstruction period.

c. Soviet Periodicals and Newspapers.

Soviet periodicals and newspapers are the most important sources available at the present time on developments in the ferrous metallurgy industry of the Ukraine. These sources were found to be accurate in the information they imparted during the reconstruction period on which prisoner-of-war reports were available for checking purposes. On the basis of that knowledge it can be assumed that current press articles are accurate also. In most plants, magazine articles and provincial press items now provide the only source of up-to-date information on developments in the installations.

d. [redacted]

These reports provide a small but fairly important contribution to intelligence on plants. A number of [redacted] consolidations of the knowledge of 20 or more prisoners of war, were of especial interest and value on the reconstruction period in the Ukraine.

e. Reports from State, Air, Navy, Army, [redacted]

These sources of information compare with [redacted] reports. [redacted] reports were extremely helpful for checking plant studies.

f. Reports from Private Engineering Companies.

Several US engineering firms made surveys for the expansion of a number of Ukrainian plants in the early 1930's. These are complete and most informative on plans for the development of these installations. In several instances these plans were not implemented, however, in others the recommendations were carried out.

2. Sources.

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

Source of Information	Information
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."

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.

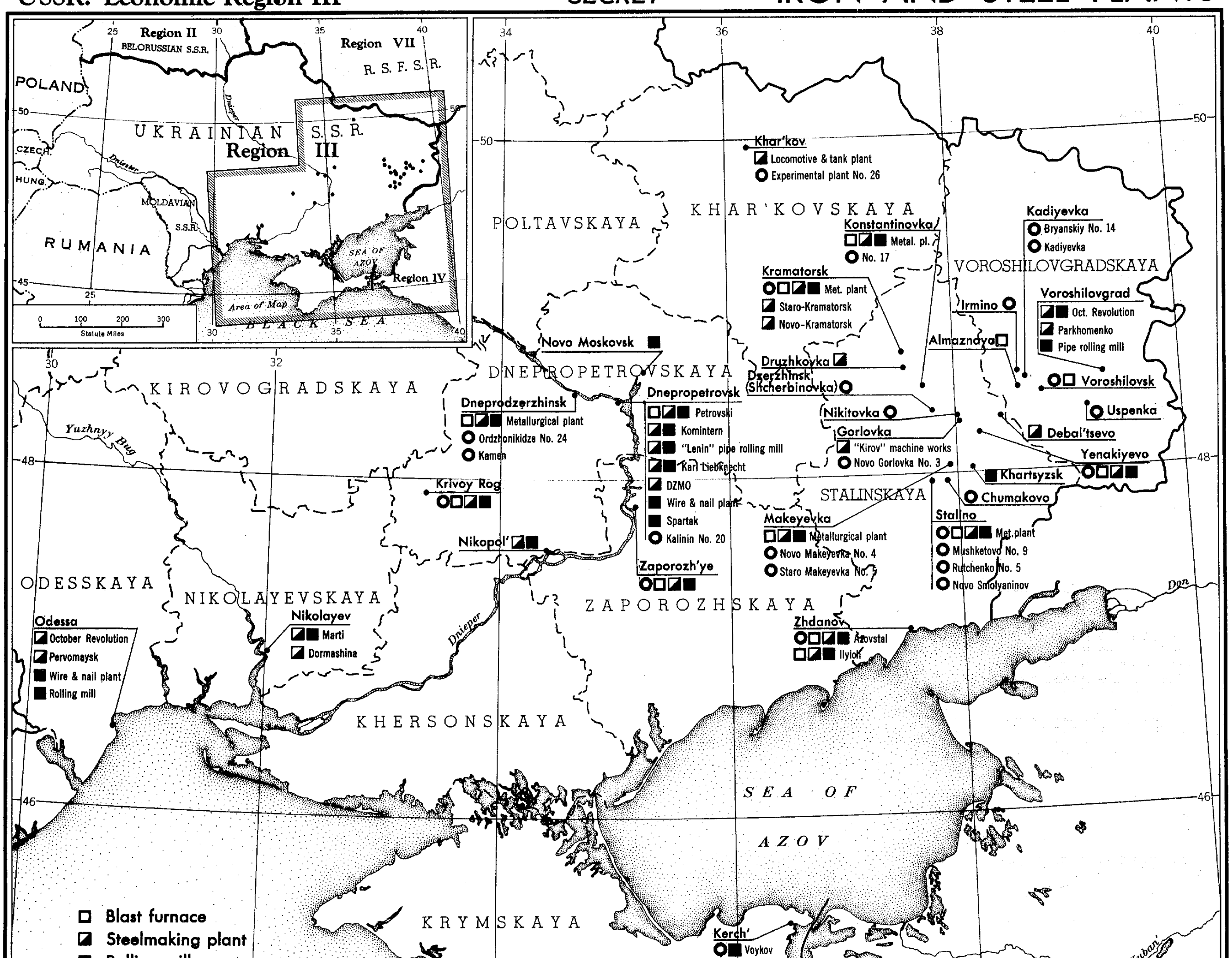
25X1A2g

[redacted]

25X1A2g

Next 114 Page(s) In Document Exempt

USSR: Economic Region III IRON AND STEEL PLANTS



~~S-E-C-R-E-T~~

CONFIDENTIAL

CONFIDENTIAL

~~S-E-C-R-E-T~~