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A STUDY OF THE CONSTRUCTION AND THE OPERATION OF THE KUYBYSHEV METALLURGICAL PLANT IMENI LENIN

CENTRAL INTELLIGENCE AGENCY

Office of Research and Reports

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A STUDY OF THE CONSTRUCTION AND THE OPERATION OF THE KUYBYSHEV METALLURGICAL PLANT IMENI LENIN

FOREWORD

Photography of December 1959 revealed a large industrial installation (later identified as the Kuybyshev Metallurgical Plant imeni Lenin) nearing completion in the Bezymyanka suburb of Kuybyshev. Because this plant came into operation at a time when the Soviet program for production of ICBM's was estimated to be expanding and has linked Kuybyshev to some phase of the program for production of ICBM's, this plant has been suspected of containing an ICBM assembly facility in addition to known metallurgical fabrication processes. The purpose of this report is to analyze all available information on the design, construction, equipping, and operation of the enterprise in order to determine what operations take place in this plant and what part, if any, this plant plays in the Soviet program for production of ICBM's.

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Photographs

A STUDY OF THE CONSTRUCTION AND THE OPERATION OF THE KUYBYSHEV METALLURGICAL PLANT IMENI LENIN*

Summary and Conclusions

The Kuybyshev Metallurgical Plant imeni Lenin,** (***) has been reported in the Soviet press as the largest enterprise in the USSR for the fabrication of articles from light alloys. A number of metal fabrication processes have been identified at this plant, including smelting, casting, rolling, extrusion, forging, and production of bars, rods, and pipes. These processes require all the available floor-space at the plant and take up about the same amount of space as do similar processes at plants in the US.

Several buildings at the Lenin Plant are physically large enough to house assembly operations for the ICBM, but their uses for other purposes have been identified. Although the assembly of ICBM's is thereby precluded, this plant is equipped to turn out products such as extruded stiffened skin metal and large forged shapes and could be an important supplier of such parts and materials to the ICBM program in addition to its work for the civilian economy. A careful analysis of all data, however, has failed to indicate any positive evidence that links this plant with the ICBM program.

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* The estimates and conclusions in this report represent the best judgment of this Office as of 1 May 1961.

** Hereafter referred to as the Lenin Plant. (See the photograph, Figure 1, following p. 1.)

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

I. Chronology of Construction and Installation Work

Excavation of the initial site and grading for the Lenin Plant and its housing and support area may have begun as early as 1952 or 1953, and construction of the main industrial buildings probably began somewhat later. By 1957 the framework and foundations of the heavy press building (possibly the most complex building of the enterprise) were well underway, 2/ and photography of August 1958 indicates that the main buildings were all under roof but that the plant was still under construction and not in operation, 3/ although the installation of equipment had begun. The time lapse between the 1957 and 1958 photographs indicates a rapid but not unusual tempo of construction. Aerial photography of December 1959, 4/ a press report, 5/ indicate that the plant was in partial operation in December 1959 but that construction of ancillary industrial structures and workers' housing and the installation of equipment were not yet completed.

In September 1960, formal commissioning of the Lenin Plant took place. The Soviet press gave front page coverage to this event, referring to the plant as a facility for the fabrication of light alloys. 7/ Statements of personnel working in the plant indicated that, although completed, the plant was not then in full operation but was striving to attain that status. 8/

II. Plant Analysis

A. Site Plan

The ground plan of the buildings, railroads, and roads of the Lenin Plant (see Figure 2*) indicates that there is no single production "flow" which is usually seen at an assembly plant. The layout of the buildings, in parallel rows without direct interconnections between the rows, indicates that several processes take place, each of which results in a product which is shipped out directly.

The railroad network of the plant is built on the plan of a single transverse trunk from which run a number of perpendicular branches serving the parallel rows of fabrication buildings. The railroad is the chief means of transportation for material inputs and product outputs, with aluminum ingots and alloying metals being delivered to the smelter and fabricated light alloys being shipped out from the various production buildings. The intraplant roads serve mainly to connect the smelter (Building 1**) and possibly the heavy press building (Building 7) with the other buildings of the plant. Photographic analysis of the road network indicates that the major road traffic flow was between Buildings 1 and 7 with much smaller flows to the other buildings.

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* Following p. 2.

** Building numbers in this report refer to Figure 2,

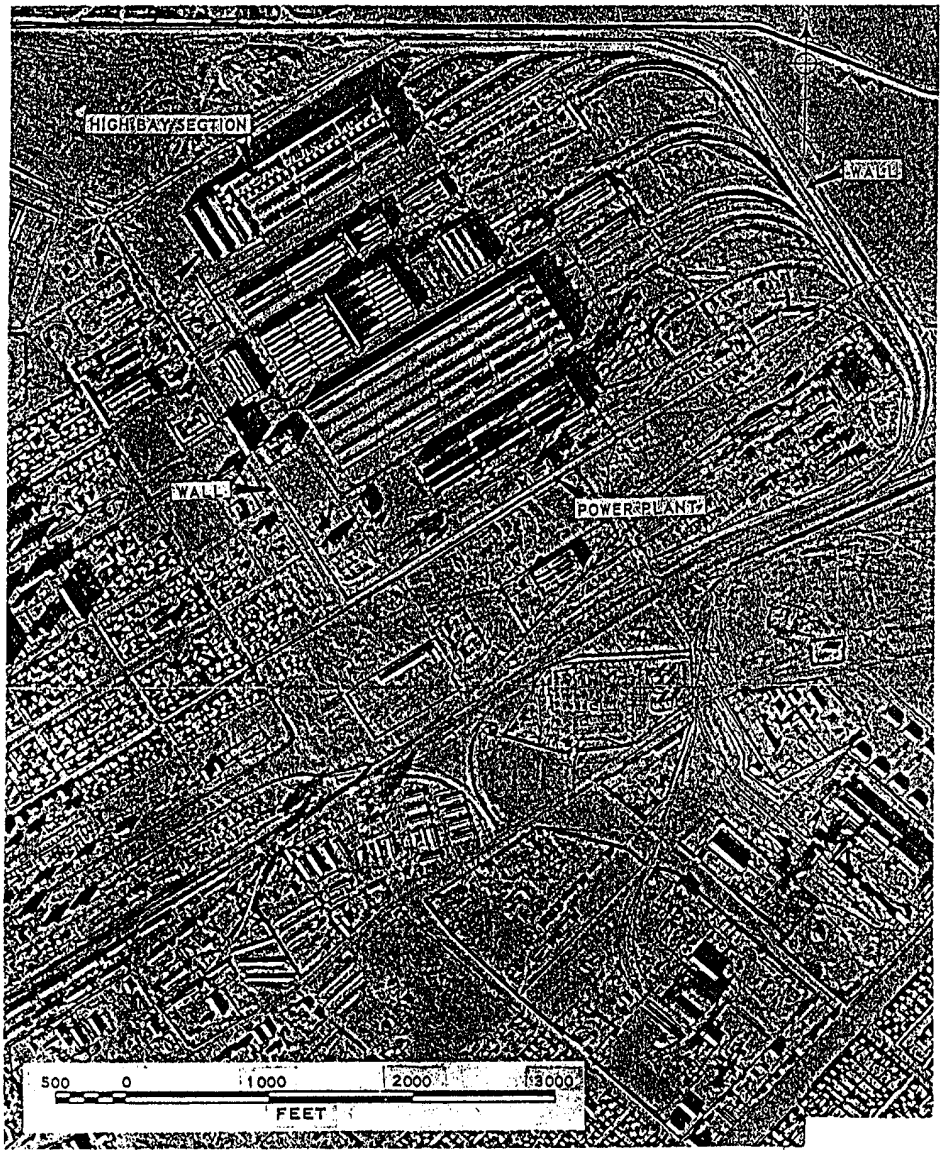
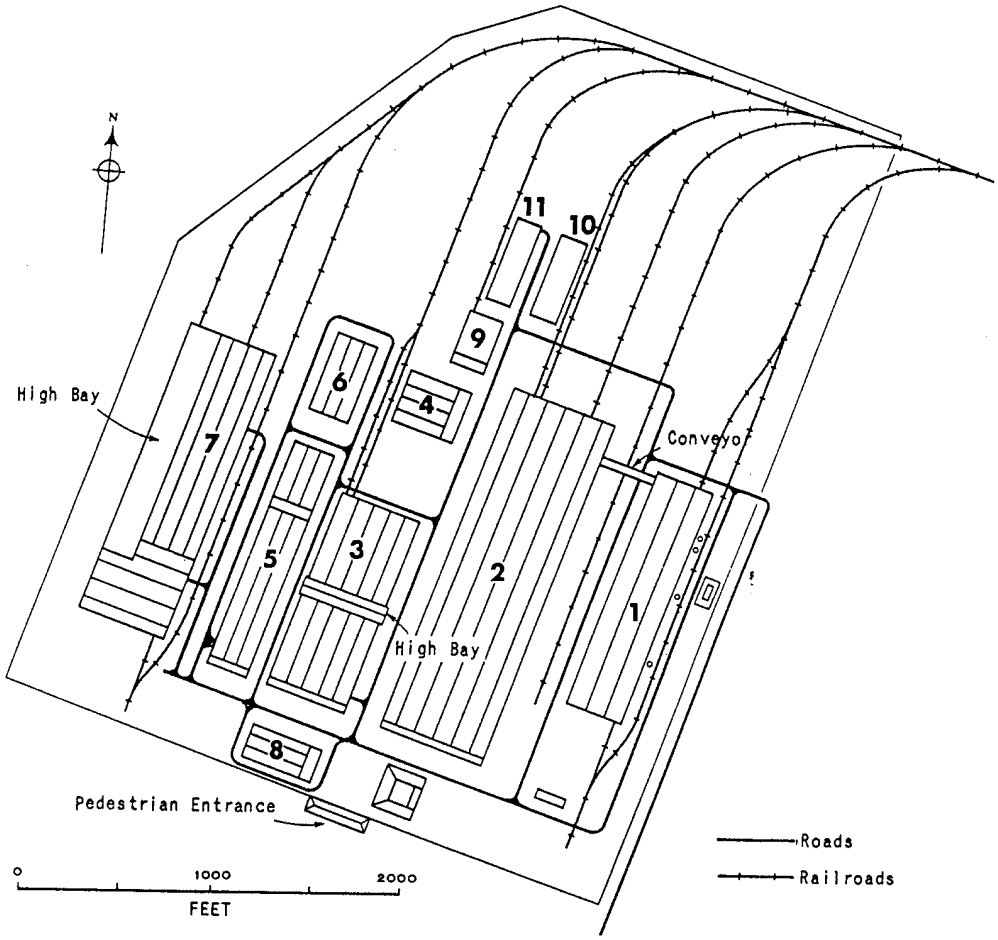


Figure 1. USSR: Kuybyshev Metallurgical Plant imeni Lenin, December 1959



Building Number	Building Identification	Length (Feet)	Width (Feet)	Height (Feet)	Floorspace (Square Feet)
1	Smelter	1,210	262	48 to 65	317,020
2	Rolling Mill	1,852	607	62 to 79	1,124,164
3		1,060	451	48 to 65	478,060
4		364	235	44	85,540
5	Pipe Mill and Rod and Bar Mill	1,210	187	39 to 47	226,270
6		350	189	Varies	66,150
7	Heavy Press Building	1,553	436	54 to 71	677,108
8	Shop Building	364	158	49	57,512
9	Unidentified	280	52	40	14,560
10	Storage Building	417	138	24	57,546
11	Storage Building	417	138	24	57,546

Figure 2. USSR: Line Drawing of the Kuybyshev Metallurgical Plant imeni Lenin

B. Identification of Processes at the Kuybyshev Metallurgical Plant imeni Lenin

Based on US standards, several buildings at the Lenin Plant are physically large enough to house ICBM assembly operations.* To evaluate this possibility, it is therefore necessary to ascertain which metallurgical processes take place at the plant and their locations in the complex. Specific fabrication processes could take place in Buildings 1, 2, and 7, and the remaining processes, although not specifically located, would take up the floorspace of Buildings 3 and 5. Analysis of evidence bearing on the processes and their locations follows.

1. Smelting and Casting

Newspaper reports of the commissioning of the plant refer to the smelter, its tall stacks, and the use of natural gas as a fuel. 9/ Building 1 is easily identified as the smelter because it is the only building in the enterprise having tall stacks and because a large natural gas pipeline can be seen leading to it (see Figure 1**). Additional evidence that smelting and casting operations take place at the plant can be found in the published job titles of some of its operating personnel, such as smelter, molder, coremaker, and blacksmith.***

2. Rolling

The rolling mills of the Lenin Plant are located in Building 2, which is the only structure in the plant large enough for the purpose and is connected to the smelter by a conveyor. These mills are reported to be "fully mechanized and automated" 10/ and probably are among the most modern in the USSR. A number of people highly qualified and well known in the field of rolling mill design, as well as operating personnel, have been connected with the Lenin Plant. † 11/

3. Presses

Two large heavy presses are known to have been installed in the Lenin Plant. These presses, together with their necessary ancillary equipment, require 700,000 to 800,000 square feet of floorspace, a high-bay area, and heavy overhead handling.†† Building 7 meets these criteria and has been identified as the heavy press building.

* Buildings 1, 2, 3, 7, and possibly 5 are large enough for ICBM assembly.

** Following p. 1, above.

†† Ancillary equipment includes preheating furnaces, a scalping section, a compressor/accumulator section, [footnote continued on p. 4]

a. Horizontal Extrusion Press

In 1957, foundations were constructed in the heavy press building for a "unique press of great capacity," according to Engineer L. V. Milideyev. * 14/ Analysis of the plans indicates that these foundations were designed for an extremely large horizontal extrusion press. Because the terms "unique" and "of great capacity" were used, it is estimated that the world's largest horizontal extrusion press (with a capacity of 20,000 metric tons), which was completed at Uralmashzavod in 1958, 15/ was referred to and has been installed. These foundations are located at the end of a high bay 1,200 feet long and 125 feet wide. 16/ As the foundations are more than 200 feet long, a total building length of more than 1,400 feet is indicated. A photograph of the foundations (see Figure 3) shows in the background the end view of the high-bay structure and a low bay. Photographic analysis indicates that this picture was taken from near the south end of Building 7 at the Lenin Plant. 17/

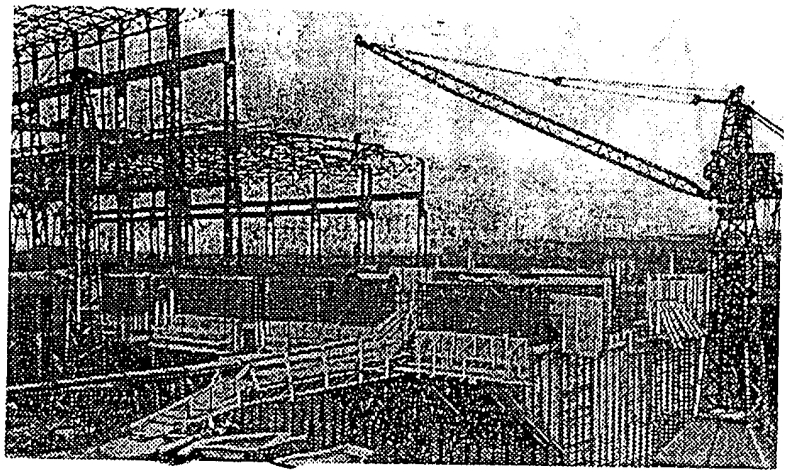


Figure 3

USSR: General View of the Foundation Construction of Building 7 of the Kuybyshev Metallurgical Plant imeni Lenin

b. Vertical Forging Press

It is estimated that the world's largest vertical forging press (with a capacity of 75,000 metric tons) has been installed in Building 7 of the Lenin Plant. Among the 13 persons who were nominated for Lenin Prizes for their work in the "design, construction, and working

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vertical heat treating furnaces, horizontal heat treating furnaces, quenching vats, a storage and loading area, and an extensive (100,000 square feet or more) diemaking shop.

out of production" of this press 18/ were 7 persons also on the awards list for work on the Lenin Plant, including F. V. Tulyankin, Chief Engineer of the Lenin Plant. 19/

Indirect evidence indicating that a large vertical forging press has been installed in Building 7 of the Lenin Plant can be gained from analysis of photography of an identical building at Verkhnyaya Salda, Sverdlovskaya Oblast (see Figure 4*), which was in an earlier stage of construction. Through the unroofed central section of the high bay of this latter building a foundation pit suitable for a large vertical forging press can be seen. Because of the identical design of the two buildings, it is estimated that they have been designed for similar purposes and, therefore, that a similar foundation has been built in Building 7. Furthermore, photographic analysis of the building at Verkhnyaya Salda 20/ indicates that the beams, roof trusses, craneways, and the like are identical with those seen in Figure 3.**

4. Production of Bars and Rods

In late 1959, that bars and rods were being produced at the Lenin Plant. 21/ The process, however, has no external identification features and cannot be specifically located in the plant.

5. Production of Pipes

Both indicate that production of pipes is included among the processes at the Lenin Plant. 22/ The process used, whether rolling, extrusion, drawing, or a combination of them, cannot be determined, but the complex of Buildings 3, 4, 5, and 6 resembles a standard site plan for a pipe rolling and drawing mill. 23/

C. Comparison with US Plants

The Lenin Plant was referred to by the Soviet press as "the largest enterprise for the production of articles from light alloys." 24/ The plant contains about 3.2 million square feet of floorspace, of which 2.8 million square feet are in the five largest buildings. A number of fabrication processes have been located at this site in order to use a common source of alloyed metal, common utilities, common support installations, and a large housing and communal support area. The economies of such a large project are obvious.

A physical comparison with an equivalent plant in the US is impossible, because all such processes generally are not located at a single site. A superficial comparison with several US plants, however, indicates that similar processes would need a floorspace of from 3 million to 4 million square feet. 25/ Thus, the over-all size of the Lenin Plant is consistent with expectations based on a composite of analogous

* Following p. 5.
** Page 4, above.

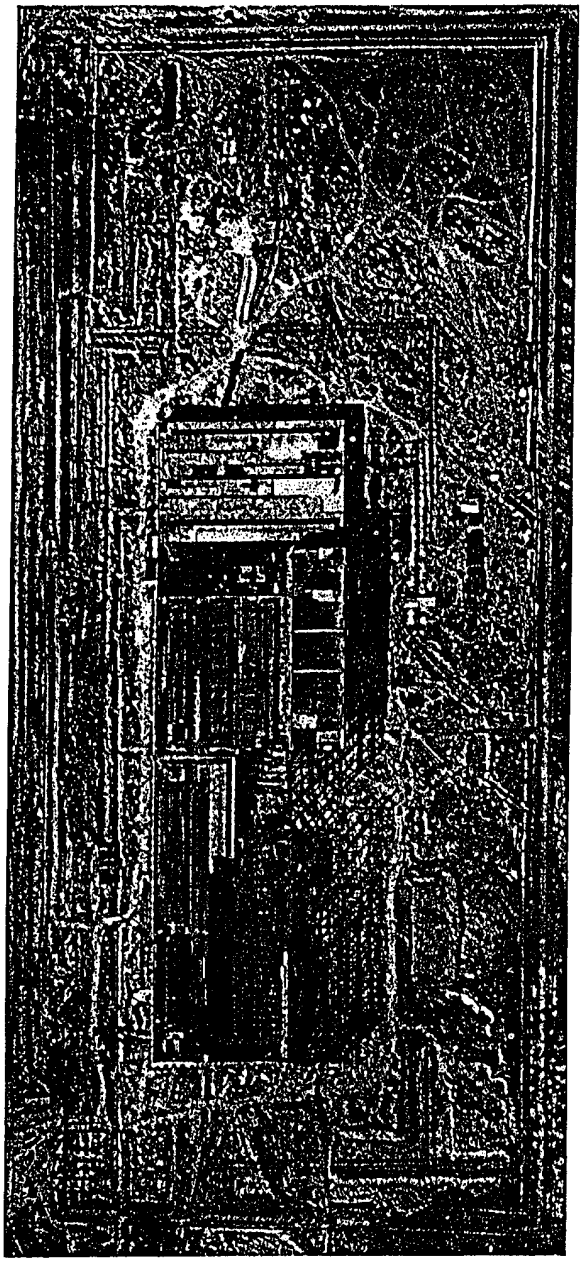

Figure 4. USSR: Unidentified Building, Verkhnyaya Salda

US plants. Furthermore, the size of the smelter at the Lenin Plant, which is large by US standards, can only be justified if the entire complex is devoted to aluminum fabrication, as indicated in the Soviet press. 26/

III. Security

Photography indicates that the Lenin Plant has the usual security precautions found at most industrial enterprises -- that is, a fence around the perimeter of the grounds and gates at all entrances. The plant has been widely discussed in the Soviet press, official press photographs of the housing area and main entrance were released, 27/

Although none of the security indicators can be used to preclude ICBM assembly at the Lenin Plant, the open treatment accorded to this plant by the Soviet government cannot be reconciled with the expected tight security which would surround an ICBM assembly plant and which is perhaps a firm indication of the relatively nonsensitive nature of this enterprise.

APPENDIX A

Appendix B

SOURCE REFERENCES

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.