SECRET

Nº 70

[redacted] 25X1C

Economic Research Aid

PRODUCTION OF BELARUS' TRACTORS AT THE DNEPROPETROVSK AUTOMOBILE PLANT NO. 186 (DAZ)

CIA/RR A.ERA 61-2

May 1961

CENTRAL INTELLIGENCE AGENCY

Office of Research and Reports

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FOREWORD

This project was undertaken to analyze the evidence that Belarus' tractors are produced at the Dnepropetrovsk Automobile [redacted] 25X1C (Dnepropetrovskiy Avtomobil'nyy Zavod -- DAZ) and to estimate the rate of production of tractors as an aid in assessing the potential of the plant for production of rocket engines, an activity in which the plant is believed to have been engaged since 1951 or 1952.

This research aid will show that DAZ was assigned the task of fulfilling the obligations of the Ministry of the Defense Industry for production of Belarus' tractors according to the agricultural decrees of September 1953 and that the plant has produced tractors at a relatively high rate up to the present.

25X1C [redacted] estimates derived from published data and for information on historical developments and the physical layout at DAZ and at the Minsk Tractor Plant, the estimates of production for DAZ are essentially from Soviet published sources. These estimates were made possible by several factors, as follows: (1) DAZ and the Minsk Tractor Plant, on which there is considerable data on production, are the only two plants in the USSR producing the Belarus' tractor; (2) data have been published either on total Soviet production of Belarus' tractors or on deliveries of this tractor to agriculture, from which production could be estimated and from which production at Minsk was subtracted to obtain a residual representing production at DAZ; and (3) reported annual production of tractors in the Ukrainian SSR was used as a total from which estimated or reported production at the established tractor plants was subtracted to obtain a residual representing production at DAZ. The latter residual and the one previously described did not differ significantly for any year.

More details on the physical aspects of DAZ are contained in CIA/RR G.CG 60-7, Dnepropetrovsk Automobile Plant No. 186 (DAZ), July 1960, SECRET.

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PRODUCTION OF BELARUS' TRACTORS AT THE DNEPROPETROVSK AUTOMOBILE PLANT NO. 186 (DAZ)* 1954-60

Summary

The Dnepropetrovsk Automobile [redacted] (Dnepropetrovskiy Avtomobil'nyy Zavod -- DAZ)** of the former Ministry of the Defense Industry (Ministerstvo Oboronnoy Promyshlennosti -- MOP) is believed to have been engaged in production of rocket engines since 1951 or 1952. DAZ also is one of two plants in the USSR producing the Belarus' tractor. From an initial output of 6,500 tractors in 1954, production at this plant in the Ukrainian SSR increased to an estimated peak of 31,800 units in 1958. DAZ produced an estimated total of 170,000 to 175,000 of these tractors by the end of 1960, with a range from 1956 of 29,000 to 31,800 units annually. The attendance of design personnel from the "tractor plant" in Dnepropetrovsk at a 1960 seminar on the use of high-speed tractors in agriculture suggests that DAZ intends to continue production in 1961. There is evidence, however, that DAZ probably will be phased out of production of tractors by 1965. Published data on the 1965 plan for a doubling of production of tractors in Khar'kov Sovnarkhoz, where the well-established tractor plants in the Ukrainian SSR are located, and on the plan for total production of 107,000 tractors in the Ukrainian SSR in 1965 indicate that no allowance has been made for production of tractors in the Ukrainian SSR outside Khar'kov Sovnarkhoz by 1965. At the same time, production of Belarus' tractors at the Minsk Tractor Plant (Minskiy Traktornyy Zavod -- MTZ) in the Belorussian SSR, the other plant in the USSR producing this tractor, is expected to increase to a minimum of 67,500 units by 1965, or more than the combined output at MTZ and DAZ in 1960.

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

25X1C ** [redacted] rather than the factory number of the facility, this research aid will use the conventional name "Dnepropetrovsk Automobile [redacted]" or "DAZ," when referring to this installation. The latest available reference in the Soviet press to the term "Dnepropetrovskiy Avtomobil'nyy Zavod" was published on 14 June 1951. 1/ (For serially numbered source references, see Appendix D.) The shortened term "DAZ," has been noted in other Soviet publications of earlier dates. 2/ It apparently, however, is still known by this term among local residents.

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Production of Belarus' tractors was initiated at MTZ a few months earlier than at DAZ and increased from an initial output of less than 500 units in 1953 to a peak of 34,500 units in 1960. In 1961, 38,000 units are to be produced. A total of about 144,000 Belarus' tractors had been produced at MTZ by the end of 1960, including all models from the original MTZ-1 and MTZ-2 to the present MTZ-5 and MTZ-7 series. Until 1958, MTZ produced a logging tractor for forestry work, in addition to Belarus' tractors, at an average annual rate of about 5,300 units.

Large-scale production of Belarus' tractors was undertaken at DAZ and MTZ as the result of an upward revision in September 1953 of the agricultural goals of the Fifth Five Year Plan (1951-55), which envisioned a substantial increase in production of row-crop tractors, including a new wheeled tractor of 37 horsepower (hp) -- the Belarus'. A decree of 20 September 1953 scheduled production in the USSR of no less than 500,000 general-purpose tractors (in 15-hp units) and 250,000 row-crop tractors (in physical units) from 1954 to 1 May 1957. The annual rate of output of 75,000 row-crop tractors indicated in the decree was 3.24 times the rate achieved in the 4 years preceding 1954 and apparently was beyond the short-run capabilities of the established tractor plants. The MOP and the Ministry of the Aviation Industry (Ministerstvo Aviatsionnoy Promyshlennosti -- MAP) were, therefore, directed to render assistance in the tractor program. The MOP was assigned the specific goal of producing, in its own plants, 5,000 Belarus' tractors in 1954 and 10,000 in 1955 plus spare parts for them. According to a wide variety of Soviet published sources [redacted] 25X1C
25X1C [redacted] the MOP concentrated production of tractors at DAZ. A total of 25,000 additional Belarus' tractors was to be produced by the end of 1955 by the Ministry of Machine Building (Ministerstvo Mashinostroyeniya -- MM). No goals were announced for the MAP, which appears to have limited its part in the tractor program to the manufacture of components.

DAZ apparently has produced the same models of Belarus' tractor that have been produced at MTZ. In 1960, for example, the MTZ-5MS was being manufactured by both MTZ and DAZ. DAZ, however, also has been producing prototypes of an experimental high-speed Belarus' E-50 tractor since 1958 and apparently will initiate production of this model when field tests are completed. To date, there has not been a positive identification of a tractor made at DAZ, nor is there any assurance that such tractors have any special mark of identification to distinguish them from those manufactured at MTZ.

Although it is known that DAZ is supplied with parts from other plants, there is no definitive information on the extent of subcontracting or on the extent of production of spare parts at DAZ itself.

Prototypes of the Belarus' E-50 tractor produced at DAZ have been equipped either with experimental engines from MTZ or with engines from the Serp i Molot Plant in Khar'kov, which indicates that DAZ probably does not produce its own engines. Furthermore, DAZ probably does not receive engines from MTZ, for production of engines at Minsk is only slightly in excess of the number of tractors manufactured. The manufacture of prototypes in its own shops, however, suggests that DAZ probably does have its own design organization and the facilities for making the major tractor components and, therefore, is not merely an assembly plant.

25X1C DAZ, [redacted] is a very large plant, but neither the total area nor the extent of the part devoted to production of Belarus' tractors is known. According to plans made at the time when construction began in 1945, the plant area was to have been about 500 acres with a total floorspace of about 4.5 million square feet (sq ft). There is no certainty that all buildings were constructed as planned. By comparison, [redacted] 25X1C
25X1C [redacted] that the plant had a floorspace of about 2.0 million sq ft and 10,000 to 11,000 employees. The latter might be considered maximum figures for production of Belarus' tractors at DAZ in 1959, but a more reasonable figure probably would be much lower, for DAZ is not known to produce its own engines and, unlike MTZ, probably is not engaged in production of tractor spare parts to the extent of at least one-tenth of the value of the total output.

I. Introduction

A. Background

In September 1953 the USSR announced an upward revision of the agricultural goals of the Fifth Five Year Plan (1951-55). An important feature of the revision was the plan to increase substantially production of row-crop tractors, including the Belarus', a new wheeled tractor of 37 hp developed at MTZ but not yet in production. A decree of 20 September 1953, outlining the particulars of planned machinery for agriculture, announced that no less than 500,000 general-purpose tractors (in 15-hp units) and 250,000 row-crop tractors (in physical units) were to be produced in the period from 1954 to 1 May 1957.* 3/ The annual rate of production of 75,000 row-crop tractors indicated in the decree was 3.24 times the reported rate achieved in the 4 years preceding 1954 and apparently was beyond the short-run capabilities of the regular tractor-producing plants controlled at that time by the MM and the Ministry of Transport and Heavy Machine Building (Ministerstvo Transportnogo i Tyazhelogo Mashinostroyeniya -- MTTM).** The MOP and the MAP, therefore, were directed to render assistance in the program for producing tractors.

The MM was scheduled to produce 10,000 Belarus' tractors in 1954 and 15,000 in 1955.*** The MOP was to produce, in its own plants, 5,000 units in 1954 and 10,000 in 1955, plus spare parts for these tractors. The MOP was given 1 month in which to submit plans for organizing the manufacture of Belarus' tractors and proposals for the additional capital investment that would be necessary during 1953 for the accomplishment of the task. 4/ There were no details as to which plant or plants of the MOP would be involved in the program.†

* The decree confined itself to the 40-month period ending 1 May 1957, but there seemed to be no implication that production of row-crop tractors would be curtailed after 1 May 1957.

** The former MM controlled all regular tractor-producing plants in 1953 except the Chelyabinsk Tractor Plant, which was controlled by the former MTTM.

*** The MM was to have produced 700 Belarus' tractors by the end of September 1953 and "considerably more" by the end of the year, 5/ but a Soviet handbook shows production of only 469 for the year.

† The wording of the decree of September 1953 as it affected the MOP is as follows:

The Council of Ministers, USSR, and the Central Committee of the Communist Party of the Soviet Union have decreed the following:

Gosplan, USSR, and the Ministries of Machine Building, Transport and Heavy Machine Building, Defense Industry, and Aviation Industry are to provide for the production for agriculture of no less than 500,000 (in terms of 15-hp units) /footnote continued on p. 6/

B. Developments

1. In the Ministry of the Defense Industry (MOP)

There is considerable evidence in Soviet publications that from the beginning of the program the MOP concentrated production of Belarus' tractors in a plant in Dnepropetrovsk.* At the same time, there is considerable evidence [redacted] and in one Soviet publication that the tractors have been and are being produced at DAZ, which also is believed to have been engaged in production of rocket engines since 1951 or 1952. DAZ is estimated to have produced from 170,000 to 175,000 Belarus' tractors during 1954-60, or approximately 20 percent more of this type of tractor than MTZ produced in the same period. Production at DAZ increased from an aggregate of 21,600 tractors in 1954 and 1955, compared with the plan of 15,000, to about 29,000 in 1956 and within a general range of 30,000 to 31,800 during 1957-60. The peak year was 1958 when, according to a Soviet publication, as many as 31,800 tractors probably were produced. These estimates are based on a combination of (a) the same publications that provided the basis for the estimates at MTZ, (b) a production figure for DAZ [redacted] d) an analysis of the annual deliveries of Belarus' tractors to agriculture, and (e) an analysis of the total production of tractors in the Ukrainian SSR and in the two tractor plants in Khar'kov.

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general-purpose tractors and 250,000 actual row-crop tractors in the period from 1954 to 1 May 1957.

To assign the Ministry of Defense Industry to:

a. Organize the production of Belarus' tractors equipped with hydraulic lifts (and of spare parts for the Belarus') in its plants from blueprints supplied by the Ministry of Machine Building.

b. Produce 5,000 Belarus' tractors in 1954 and 10,000 Belarus' tractors in 1955.

c. Together with Gosplan, USSR, submit within one month plans for organizing the production of Belarus tractors and proposals for additional 1953 capital investments.

* Although there was an early indication that Belarus' tractors might be in production in a plant in the RSFSR, estimates of the Soviet annual rate of output of Belarus' tractors and the rates of output of tractors in the Belorussian SSR and in the Ukrainian SSR indicate that there has been no significant production outside these two republics. Production in other areas probably has been concerned with components for the Belarus' tractor.

DAZ was first tentatively identified as the MOP plant producing Belarus' tractors in December 1953 when it complained that preparations for production of tractors were being delayed because of the failure to receive certain items of production equipment. Subsequently, a Soviet catalog of spare parts for row-crop tractors, published in 1955, referred to production of Belarus' tractors at the plant with Post Box Number 186,* and there have been noted eight other Soviet publications covering the period 1957-60 that refer to production of tractors at Dnepropetrovsk. Four of these sources specifically refer to Belarus' tractors.** [redacted] 25X1C

25X1C [redacted]

It apparently has been the practice for DAZ to produce the same model of the Belarus' tractor that is in production at MTZ. For example, a Soviet agricultural journal of May 1960 reported that both the Minsk and Dnepropetrovsk plants were producing the Belarus' MTZ-5MS model in 1960. 7/ At the same time, there is evidence that DAZ has its own tractor design organization, has the facilities for producing tractor prototypes, and possibly will initiate production of a Belarus' model different from those produced at MTZ. Evidence of the existence of design facilities at DAZ is contained in a Soviet agricultural journal which states that designers from the tractor plant in Dnepropetrovsk attended a seminar at Armavir in 1960 to discuss the use of tractors in agriculture at higher speeds. 8/ Regarding facilities for production of prototypes, it is known that the plant has produced prototypes of an experimental high-speed tractor. In 1958 a

25X1C [redacted] that E-50 (E - eksperimental'nyy) wheeled tractors had been produced at Dnepropetrovsk. The tractor used a new 50-hp D-50 engine developed by MTZ. 9/ In January-February 1959 a Belarus' E-50 tractor, produced in the Dnepropetrovsk Sovnarkhoz and equipped with a 50-hp SMD-4 engine, was on display at the industrial exhibit in Moscow. 10/ The SMD-4 is a Serp i Molot diesel engine produced by the Serp i Molot Plant in Khar'kov. Three of these E-50 tractors were being tested in Omskaya Oblast in 1959, and others were being tested in the Kuban'. 11/ That DAZ possibly will begin production of a tractor of its own design is indicated in an article by a Soviet author discussing agricultural developments in the Ukrainian SSR and emphasizing the use of high-speed tractors. The article stated that the "Belarus' Plant" intended to switch over in 1960 to "the speedier

* There is, however, no known reference in any Soviet publication that pinpoints DAZ by name as a producer of tractors.

** Most of these publications are referred to at various times in the text of this research aid, but they are given in detail in Appendix A.

type of wheeled tractor," apparently a reference to the E-50 discussed a few paragraphs earlier in the same article. 12/ The tractor was still being tested in December 1960 13/ and probably was not yet ready for production. There has been no mention of the E-50 in connection with MTZ.* It would facilitate the identification of a DAZ-produced tractor considerably if it could be established conclusively that the plant was making a model different from that made at MTZ. To date, however, there has not been a positive identification of a Belarus' tractor produced at DAZ.**

* It is possible that the work on the E-50 at DAZ is simply a separate attempt to create a tractor with the general technical characteristics of the MTZ-50 that is under development at MTZ.

** There is no assurance that DAZ puts any special form of identification on the tractors that it manufactures. It may simply use the Minsk nameplate. At an exhibit in France in 1960, intended as a demonstration of the industrial progress of the Ukrainian SSR, there were displayed Belarus' tractors that were clearly identified by the standard MTZ nameplate. These tractors had various agricultural machines attached to them which were produced in the Ukrainian SSR, and the latter may have been the items which were intended as a demonstration of Ukrainian progress. On the other hand, a Soviet agricultural official, when describing the tractors used in his area in 1957, stated that among those available were MTZ-2 models manufactured at the "Minsk Tractor Plant in Dnepropetrovsk." 14/ Of possible significance are photographs of four tractors that have an unusual radiator emblem. Instead of the standard "MTZ" emblem at the top of the radiator, with the "T" in the center and larger than the other letters (a seemingly unalterable characteristic of the "T" in the radiator emblem of the regular Soviet tractor plants), these four tractors have a long, narrow emblem plate running vertically down the center of the radiator. Most of the space on the emblem is taken up with the word BELARUS'. Just above the "B" is a horizontal grouping of three small letters, the last two of which clearly are "MZ." Although it is oddly shaped, the first letter appears to be a "T." The meaning of these letters has not been determined. No record of a grouping such as this in just such a form is available [redacted]. The tractor in 25X1B the 1954 photograph, indicated on an accompanying placard as an MTZ-2, is slightly different from the other three in that the elongated radiator emblem is topped with an open star. The angle is such that it is impossible to tell what appears in the center of the star. It probably is an additional plant emblem. The letters "TMZ" may represent nothing more than a transposition of the letters "MTZ," but this explanation does not indicate why Minsk would have produced so very few tractors with this emblem or, if the emblem is a variation of the Minsk emblem, why it would not have appeared at some time in brochures and tractor manuals or more frequently in the numerous /footnote continued on p. 9/

One of the unknown features of production of tractors at DAZ that must remain unanswered for the present is the extent to which production of components is subcontracted. The answer to this question would determine whether DAZ is as heavily engaged in producing the major components of a tractor as is MTZ or whether it is primarily a tractor assembly plant. The fact that DAZ has produced a number of units of the experimental E-50 tractor, excluding the engine, suggests that it probably has facilities devoted to production of some of the major components.

Because each plant apparently produces the same model of Belarus' tractor, it would seem reasonable to assume that DAZ subcontracts at least to the same extent as does the Minsk plant and that both are supplied by many of the same plants. Items and suppliers that have been identified with Minsk, and probably are involved with DAZ also, include rear tires from the Yaroslavl' Tire Plant, front tires from the Voronezh Tire Plant, electric drive systems from Yaroslavl' Sovnarkhoz, hydraulic equipment from a plant in Borisov, and instrument panel equipment from Riga. There may be major differences between the two plants, however, with respect to the extent to which each produces spare parts and engines for tractors. Ten to 12 percent of the value of the output at Minsk is comprised of spare parts, some of which are produced in special facilities set aside for the purpose. MTZ, often considered as a useful aid for analyzing the area devoted to production at DAZ, in view of this high rate of output of spare parts, would not readily serve such an end unless information were available indicating that DAZ was similarly oriented. In addition, Minsk is known to produce its own engines, including a limited quantity for replacement, and is the only known producer of the D-40 series, which has been the standard engine on the Belarus' tractor in recent years. No definitive information is available, however, concerning engine production at DAZ. In one instance, DAZ produced a Belarus' E-50 tractor equipped with an experimental engine from MTZ, but output at MTZ is insufficient to supply DAZ on a regular basis. In another instance, DAZ produced an E-50 with a diesel engine from the Serp i Molot Plant in Khar'kov, which specializes in diesel engines for tractors and grain combines. Although the Serp i Molot Plant may

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published photographs of the Belarus' tractor. It is unlikely that these tractors represent some of the first models of the Belarus' manufactured at Minsk, for two of the photographs are from Soviet publications of 1959 and a third was taken in 1960. Furthermore, on a photograph of October 1953 from a Soviet publication, the slightly protruding Minsk emblem at the top of the radiator is clearly discernible. 15/ The answer may be that these are examples of DAZ-produced Belarus' tractors. Figures 1 and 2, following p. 10, are photographs that best show the emblem in question. Figure 3, following p. 10, is a photograph of a tractor showing the standard MTZ radiator emblem.

now be in a position to supply DAZ, it probably has not always done so, for press reports state that Serp i Molot produced gasoline engines for grain combines for several years and did not begin manufacturing diesel engines until 1957. On the other hand, in spite of the press reports, there possibly may be some significance in the fact that the Serp i Molot Plant began the conversion from agricultural machinery to engines in 1954, the same year in which DAZ began producing tractors. In any event, there is no evidence which indicates that DAZ builds its own engines for the Belarus' tractor.

2. In the Ministry of Machine Building (MM)

The MM concentrated production of Belarus' tractors in MTZ where it had been developed, and various ministerial changes since 1953 have not altered this arrangement. Soviet statistical handbooks, annual reports of plan fulfillment, and reporting in the press and radio indicate an aggregate production of about 144,000 of these tractors at Minsk from October 1953 through 1960.* The Belarus' tractor bearing the model designation MTZ has gone through numerous modifications during this period, including a change from a 37-hp to a 50-hp engine, a 25-percent decrease in weight, four-wheel drive on some models, and a closed cab on some models. The tractor has not changed greatly, however, in general appearance. Production has progressed from the MTZ-1 and MTZ-2 through the MTZ-5 and its several variations (MTZ-5K, MTZ-5L, MTZ-5M, MTZ-5LS, and MTZ-5MS) to the MTZ-7. The MTZ-50, MTZ-52, MTZ-54, MTZ-60, and MTZ-62 are among those currently being tested.

Logging (trelevochnyy) tractors for forestry work were produced at Minsk at an average rate of about 5,300 units annually until some time during the second half of 1958. 16/ With the termination of production of logging tractors, Belarus' tractors were manufactured in significantly greater quantities than in previous years -- about 30,300 units in 1959 and 34,500 in 1960 compared with approximately 22,500 in 1958. In 1961, there are to be produced 38,000 units, which include a scheduled exceeding of the plan by 2,000 units. 17/

MTZ produces its own diesel engines for the Belarus' tractor, as well as the small 10-hp gasoline starting engine, and all other main units such as transmission, frame, and axles. [redacted] 25X1B

25X1B [redacted] that during 1955-58 production of engines and tractors was progressing at about the same rate with only a small excess production of engines, presumably for replacement purposes. 18/ A

25X1B [redacted]

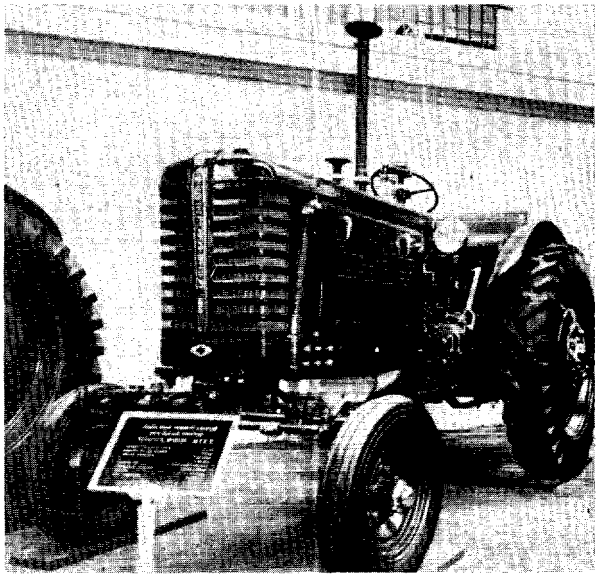

Figure 1. USSR: Example of a Radiator Emblem of a Belarus' Tractor Unlike That of the Minsk Tractor Plant. Possibly a Product of DAZ

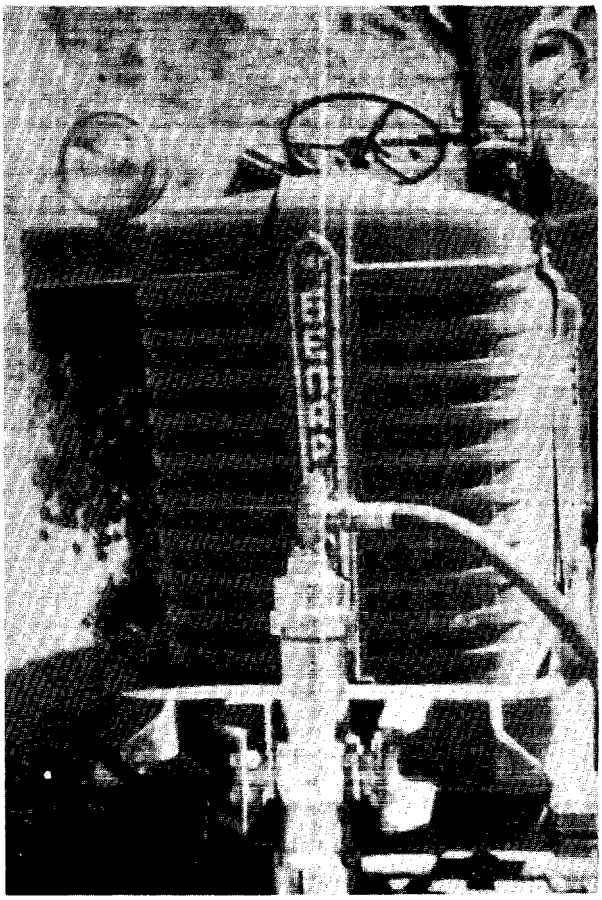

Figure 2. USSR: Second Example of a Radiator Emblem of a Belarus' Tractor Unlike That of the Minsk Tractor Plant. Possibly a Product of DAZ

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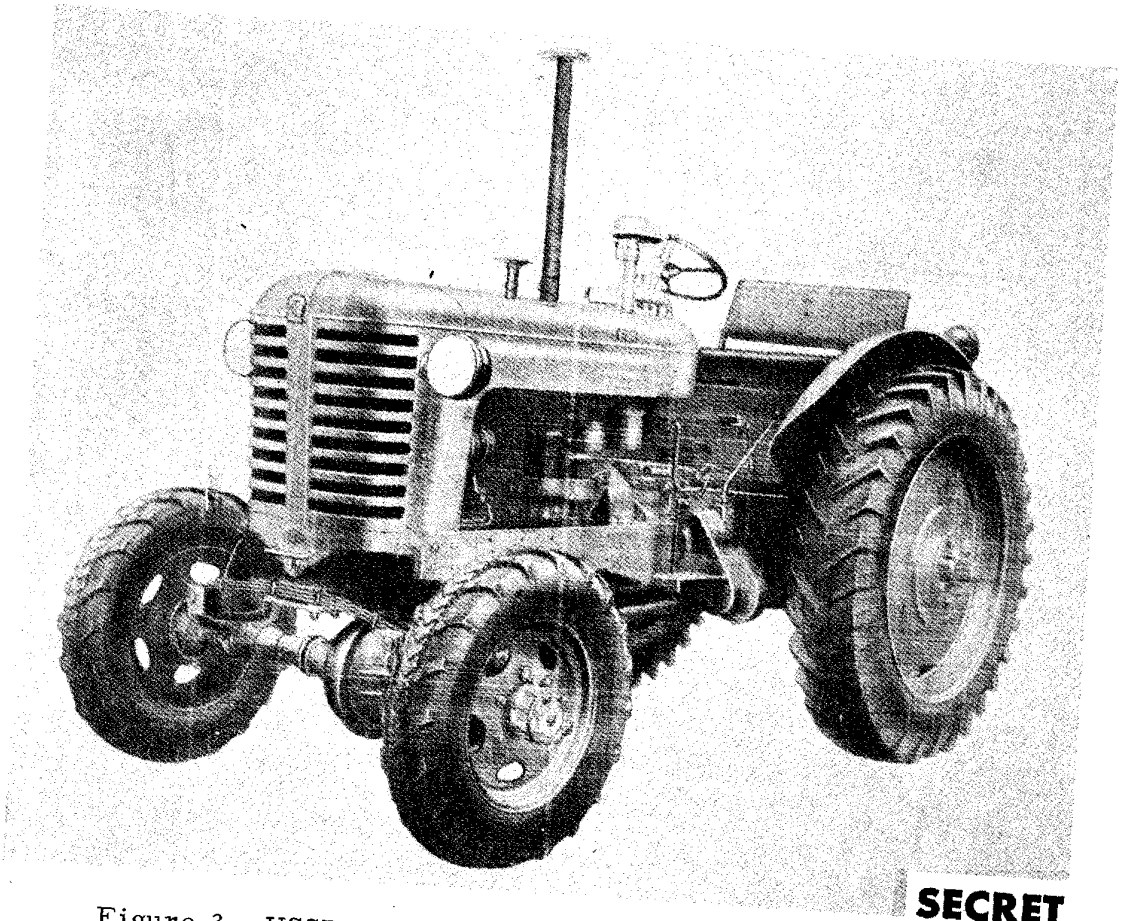

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Figure 3. USSR: Radiator Emblem of a Belarus' Tractor of the Minsk Tractor Plant

visitor was told that the plant receives from other plants such items as ball bearings, piston rings, valve springs, valves, hydraulic pumps, diesel injection pumps, fuel nozzles, asbestos clutch facings, steering wheels, rubber tires, and wheel rims. The plant has an automatic line for production of pistons and supplies some of these to other plants. There are special facilities devoted entirely to production of spare parts for MTZ-produced tractors as well as for other types of tractors used in the Minsk area. Spare parts account for about 10 to 12 percent of the total value of output. 19/

3. In the Ministry of the Aviation Industry (MAP)

Although the MAP was included among the ministries that were to assure output of tractors as outlined in the decrees of September 1953, there has been no indication that the MAP was given any specific goals for production of Belarus' tractors. The only activity of the MAP in this respect probably has been in connection with providing parts.

C. Future Prospects

1. At the Dnepropetrovsk Automobile Plant (DAZ)

According to a Soviet agricultural journal, engineers and designers from the tractor plants in Khar'kov, Minsk, and Dnepropetrovsk attended a 1960 seminar at Armavir to discuss higher speed tractors and agricultural machinery, 20/ which indicates that DAZ probably intends to continue producing tractors at least through 1961. Such continuation seems probable in view of the fact that the conversion of Soviet tractor plants to higher speed tractors is just beginning. KhTZ, for example, switched to the higher speed T-75 tracklaying tractor in the last quarter of 1960, and MTZ is to switch entirely to production of higher speed Belarus' tractors in 1961. 21/ Earlier it had been reported that the "Belarus' Plant" in the Ukrainian SSR would switch to higher speed tractors in 1960. 22/ These bits of evidence suggest that DAZ probably is producing tractors in 1961, but they give no clue as to whether or not there has been any change in the rate of output.

Analysis of recently published Soviet data, however, suggests that there are plans for the termination of production of Belarus' tractors at DAZ by 1965. A Soviet handbook, which went to the editor in mid-September 1959, reported that 107,000 tractors will be produced in the Ukrainian SSR in 1965 compared with 82,000 in 1958, an increase of 30 percent. 23/ Another Soviet publication of January 1959 reported that production of tractors in Khar'kov Sovnarkhoz in 1965 would be 2.13 times that of 1958. 24/ Production of tractors at

KhTZ and the Khar'kov Tractor Assembly Plant (Khar'kovskiy Traktornyy Sobrannyy Zavod -- KhTSZ) for 1958 has independently been estimated at about 50,000. On the basis of the 2.13 ratio, planned output in 1965 for these plants would be very close to the 107,000 tractors to be produced in the entire Ukrainian SSR in 1965. Thus KhTZ and KhTSZ, with no help from DAZ, apparently are scheduled to provide the entire production of tractors scheduled for the Ukrainian SSR in 1965. This indication of a possible phasing out of production of tractors at DAZ is strengthened by the information that MTZ intends to increase its output of Belarus' tractors by 1965 to a level in excess of that now achieved by the combined output of MTZ and DAZ.*

2. At the Minsk Tractor Plant (MTZ)

The Seven Year Plan (1959-65), according to reports of 1959 and early 1960, scheduled an increase in production of tractors at MTZ to 18 percent of planned Soviet production of 375,000 tractors in 1965, or about 67,500 units. 25/ In 1958, MTZ produced about 26,100 tractors, which accounted for 12 percent of Soviet production of 219,700 tractors. The workers of MTZ, however, have pledged to produce 73,000 more tractors during the Seven Year Plan than were originally scheduled. 26/ If this pledge is fulfilled, MTZ by 1965 will be producing considerably more than the estimated total of 65,000 to 66,000 units produced by MTZ and DAZ together in 1960.

An increase in production at MTZ is to be achieved through a combination of new construction (total extent unknown); more modern equipment, including a number of automatic lines; more efficient use of existing equipment; and greater specialization of production, which will involve the transferring of production of tractor parts to a number of other enterprises. 27/

II. Production

A. General

Although Soviet publications do not refer to the annual level of output of Belarus' tractors at Dnepropetrovsk [redacted] 25X1B
25X1B [redacted], it is nevertheless possible on the basis of these publications, [redacted] 25X1B
25X1B [redacted]
to determine production of tractors in Khar'kov Sovnarkhoz, in the Ukrainian SSR, and in the Belorussian SSR. These estimates are bolstered by figures (undoubtedly rounded) on output by DAZ in 1956

* See Appendix B, p. 35, below.

and 1957 that originated with the chief engineer of KhTZ a [redacted] 25X1C
25X1C [redacted] The evidence shows (1) that production of tractors in the Ukrainian SSR increased sharply to 40,400 units in 1954 and 71,600 in 1956 compared with only 28,500 in 1953, before the program for increasing output of Belarus' and other types of row-crop tractors was initiated and without any evidence of increases of this magnitude at established tractor plants in the Ukrainian SSR; (2) that since 1954 MTZ has consistently produced considerably fewer Belarus' tractors annually than were being delivered to agriculture; and (3) that the estimated excess production of Belarus' tractors outside Minsk has consistently approximated the residual production in the Ukrainian SSR after an accounting was taken of output at the two established tractor plants. On the basis of this evidence, it has been established that DAZ increased its production of Belarus' tractors from 6,500 units in 1954 to 15,100 in 1955 and to a peak of about 31,800 units in 1958. Production, generally, has averaged 29,000 to 31,800 units annually during 1956-60.

B. Production of Tractors in the Ukrainian SSR

1. Total Production

Data on the total production of tractors in the Ukrainian SSR is regularly reported in a variety of publications. About 88,000 tractors were produced in 1960 compared with 71,600 in 1956 and 28,500 in 1953. Annual production during 1953-60 is shown in Table 1.*

2. Producing Plants

There are only three tractor plants in the Ukrainian SSR. The two well-publicized plants are KhTZ (wheeled and tracklaying tractors) and KhTSZ (wheeled tractors). Estimates of the aggregate production of these plants may be subtracted from total production of tractors in the Ukrainian SSR to obtain a residual that represents output at DAZ, the third plant.

The relative preciseness of the estimates for each of the Khar'kov plants for most of the years in the series could not be justified on the basis of the information on these two plants alone. It was possible, however, on the basis of this information to arrive at estimates that were within a range of a few thousand units of those shown in Table 1. The data in Table 1 for certain years reflect the influence of other information concerning production of tractors at MTZ and, consequently, on production at DAZ. For example, output of 11,300 tractors at KhTSZ in 1954 could be derived easily from Soviet

* Table 1 follows on p. 14.

Table 1

Estimated Production of Tractors in the Ukrainian SSR by Producing Plant a/ 1953-60

Thousand Units

Year	Khar'kov Tractor Plant	Khar'kov Tractor Assembly Plant	Residual b/	Total
1953	22.5	6.0	0	28.5
1954	22.6	11.3	6.5	40.4
1955	34.7	7.5	15.1	57.3
1956	39.6	3.0	29.0	71.6
1957	39.9	4.0	30.2	74.1
1958	42.7	7.5	31.8	82.0
1959	42.8	7.5	30.5	80.8
1960	49.0	8.0	31.0	88.0

a. For methodology and sources, see Appendix B.
b. See footnote b, Table 5, p. 19, below.

publications. An independent estimate for KhTZ, on the other hand, necessarily had to be [redacted] coupled with a 25X1B
Soviet published figure on the total production of DT-54 tracklaying tractors and, on this basis, could reasonably be about 22,600 units. The choice of the figure 22,600 shown in Table 1 reflects the fact that other data on output of Belarus' tractors in the USSR and at MTZ indicated an excess production outside Minsk of 6,500 units that was considered to be production at DAZ. The contrived nature of some of these estimates does not detract from their usefulness as approximations of output by plant. For the more recent years the most reliable estimates are those shown for KhTZ for 1958 and 1959 and KhTSZ for 1958. The first two of these estimates were reported in a Soviet publication, and the third was readily derivable from published data. The estimate for KhTSZ in 1959 and the estimates for both plants in 1960 are less
25X1C firm. [redacted] however, provide the basis for the figure shown for that plant and thus assure its general reliability. The residual figures for the period 1957-60, representing production at DAZ, rest solely on estimates of production at the Khar'kov plants and are intended as approximations of output by DAZ.

The sharp fluctuation in output at KhTSZ, although not entirely explainable (particularly for 1956), suggests that the plant was more of an assembly plant in 1954 than it has been at any time since.

In 1955, for example, KhTSZ was making many of its own engine components and probably its own engines, [redacted] production of cylinder sleeves, camshafts, and bearing rings, 28/ possibly indicating that the plant began production of diesel engines for tractors as early as 1955.* On the other hand, such components may be for gasoline engines for general agricultural use, 4,000 units of which were to be produced by the plant in 1956. 30/ [redacted] the plant supplied more than 2,000 "machines" above plan in 1955 for the construction of the Irkutskaya hydroelectric powerplant. 31/ In 1956, KhTSZ was the first plant in the USSR to initiate regular production of self-propelled chassis, which may have involved unforeseen delays. In recent years the Soviet press has indicated that tower cranes and large, self-propelled crawler-mounted cranes of 30-ton hoisting capacity are manufactured by KhTSZ. 32/

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C. Production of Belarus' Tractors in the USSR and the Belorussian SSR

1. In the USSR

A useful tool for estimating production of Belarus' tractors at DAZ is the annual rate of output of these tractors in the USSR as a whole. The total output may be used in conjunction with output at MTZ to secure a residual representing production at DAZ. Data on Soviet production of Belarus' tractors during 1953-55 is contained in an official handbook. Estimates for the period 1956-59 have been based on the reported annual deliveries of these tractors to Soviet agriculture. Data on the number of Belarus' tractors delivered to agriculture in 1960 are not available.

Annual production of Belarus' tractors in the USSR and deliveries to agriculture during 1953-59 are shown in Table 2.**

2. In the Belorussian SSR

MTZ is the only producer of tractors in the Belorussian SSR. Data on the plant for an extended production series is the best for any Soviet tractor plant. Output at Minsk amounted to 5,000 to 6,000 tractors in 1952 and 1953 but increased sharply to 14,300 units in 1954, 24,900 in 1957, and 34,500 in 1960. The increases were obtained through a combination of new construction, new equipment, subcontracting, and terminating production of logging tractors.

* A parts catalogue of 1959 reported that the plant manufactured diesel engines for self-propelled chassis. 29/

** Table 2 follows on p. 16.

Table 2

Estimated Production of Belarus' Tractors in the USSR and Deliveries to Agriculture a/
1953-59

Thousand Units

Year	Production b/	Deliveries c/
1953	0.5	0.4
1954	14.8	13.2
1955	27.9	23.9
1956	45.0-45.7 d/	39.7
1957	48.7-49.1	42.6
1958	52.9-53.3	46.3
1959	59.3-59.8	51.9

a. For methodology and sources, see Appendix B.
b. Reported production for 1953-55 has been rounded to the nearest hundred tractors.
c. Reported deliveries to agriculture have been given in handbooks only in rounded form.
d. The minimum figure in this range represents production at MTZ plus production at DAZ reported by an official of a Soviet tractor plant.

Until 1953, MTZ manufactured only logging tractors for forestry work, including engines. Production of Belarus' wheeled tractors began in October 1953 in accordance with the agricultural decrees of September 1953, but fewer than 500 were released by the end of the year. Belarus' tractors, output of which increased from 8,300 in 1954 to 22,500 in 1958, were produced concurrently with logging tractors until some time in the second half of 1958, when production of logging tractors was phased out. An immediate increase in 1959 of 35 percent in the annual rate of production of Belarus' tractors not only was anticipated but was achieved. Beginning in 1959, MTZ concentrated on Belarus' tractors. The annual production of tractors at Minsk, by type, is shown in Table 3.*

The annual residual production of Belarus' tractors obtained when the output at Minsk is subtracted from output for the USSR, as a whole, is shown in Table 4.**

* Table 3 follows on p. 17.
** Table 4 follows on p. 18.

Table 3

Estimated Production of Tractors at the Minsk Tractor Plant a/
1952-61

Units

Year	Total b/	Belarus'	Logging
1952	5,097	0	5,097
1953	6,540	469	6,071
1954	14,297	8,347	5,950
1955	18,266	12,822	5,444
1956	21,250	16,000	5,250
1957	24,900	19,200	5,700
1958	26,100	22,500	3,600
1959	30,300	30,300	0
1960	34,500	34,500	0
1961	38,000 c/	36,000	0

a. For methodology and sources, see Appendix B.
b. Data for 1957-60 are rounded to the nearest hundred tractors.
c. Plan including a scheduled exceeding of the plan by about 2,000 units. 33/

D. Production of Belarus' Tractors at the Dnepropetrovsk Automobile Plant (DAZ)

With the data acquired from the various sources and the methods described in the previous sections of this research aid, it is possible to construct a time series for production of Belarus' tractors at DAZ. This series, covering the period 1953-60, is given in Table 5,* based on the ranges developed in Tables 1** and 4.*** In order to provide a composite picture, Table 5 also gives estimated production of Belarus' tractors in the USSR and at MTZ.

As mentioned in I, above, DAZ exceeded the planned aggregate production of 15,000 tractors scheduled for the MOP in 1954 and 1955 by nearly 7,000 units. Production during 1956-60 probably has ranged from 29,000 to 31,800 units annually. There appears to be a plan for phasing DAZ out of the tractor program by 1965, but available evidence suggests the possibility of production continuing at least into 1961.

* Table 5 follows on p. 19.
** P. 14, above.
*** P. 18, below.

Table 4

Estimated Production of Belarus' Tractors in the USSR at the Minsk Tractor Plant and Residual Production a/ 1953-59

Thousand Units

Year	USSR	Minsk Tractor Plant	Residual b/
1953	0.5	0.5	0
1954	14.8	8.3	6.5
1955	27.9	12.8	15.1
1956	45.0-45.7 c/	16.0	29.0-29.7
1957	48.7-49.1	19.2	29.5-29.9
1958	52.9-53.3	22.5	30.4-30.8
1959	59.3-59.8	30.3	29.0-29.5

a. Constructed from data in Table 2, p. 16, and Table 3, p. 17, above.

b. See footnote b, Table 5, p. 19, below.

c. The minimum figure in this range represents production at MTZ plus production at DAZ reported by an official of a Soviet tractor plant.

Whether DAZ was able to achieve a high level of output from the beginning because it possessed considerable idle capacity that was hurriedly put to use or whether capacity devoted to other products was hurriedly converted to tractors is not known. The first assumption would appear to be a reasonable explanation in view of the size of the plant and the fact that the manufacture of trucks for which the plant was intended was never initiated on a large scale. Initiation of production of rocket engines at DAZ in 1951 or 1952 34/ presumably did not involve the entire facilities of the plant. When the high priority program for increasing production of tractors was established in 1953, the idle capacity at DAZ offered a logical solution to the problem of lack of adequate capacity in plants of the tractor industry.

25X1C DAZ, [redacted], is an enormous plant, but neither the total area of the plant nor the extent of the plant devoted to production of the Belarus' tractor is known. By analogy with MTZ, which produced about the same number of tractors in 1959 as DAZ, the latter possibly may have as much as 2.0 million sq ft of floorspace and 10,000 to 11,000 workers allocated to production of tractors. [redacted] that the plant had a floorspace of about 1.72 million sq ft, [redacted] 1956 indicates a figure of at least 2.0 million sq ft. DAZ, however, probably does not produce its own engines, and, unlike MTZ, tractor

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* Following p. 18.

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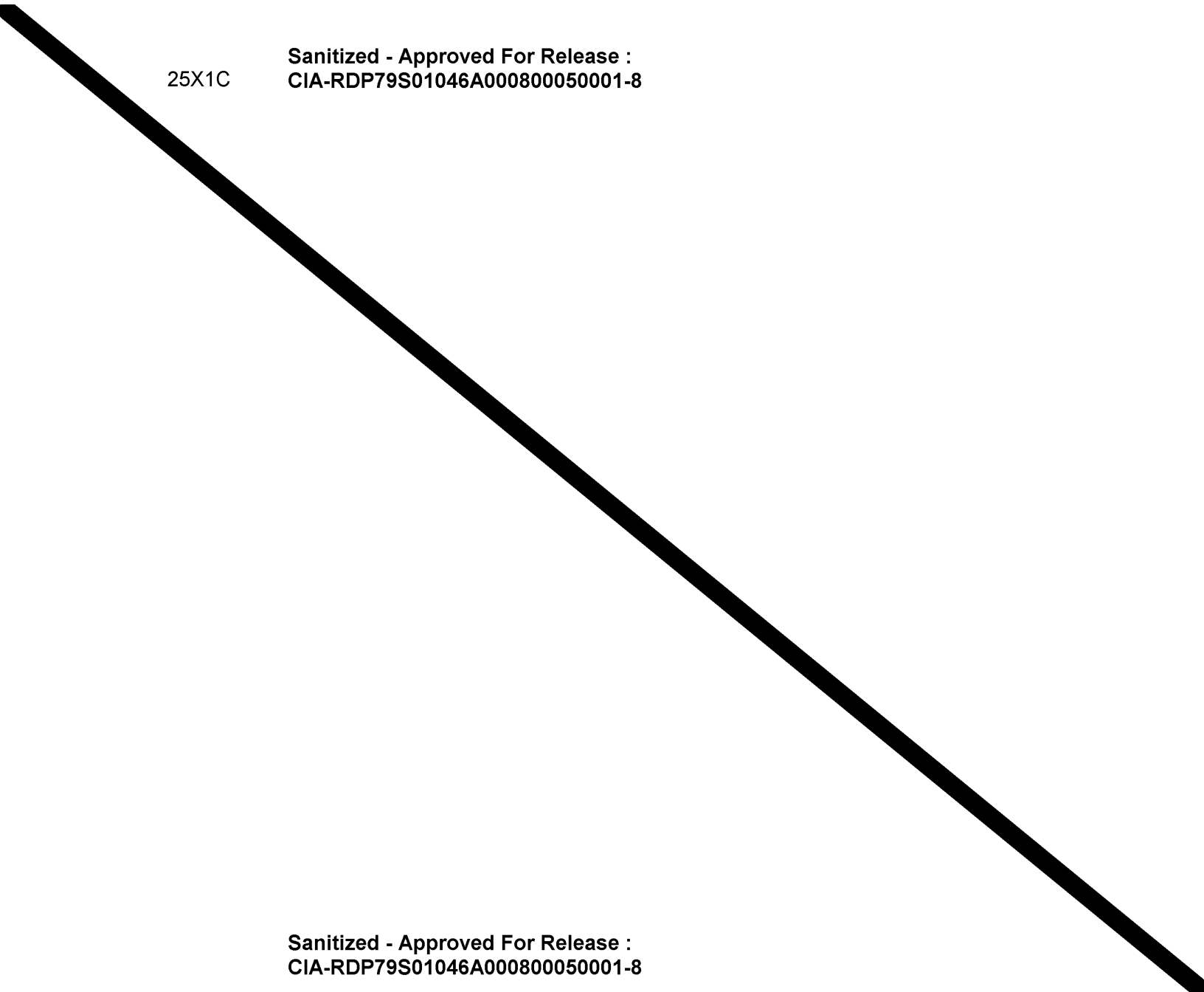

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Table 5

Estimated Production of Belarus' Tractors in the USSR, by Plant a/ 1953-60

Thousand Units

Year	Total	Minsk Tractor Plant	Dnepropetrovsk Automobile Plant b/
1953	0.5	0.5	0
1954	14.8	8.3	6.5
1955	27.9	12.8	15.1
1956	45.0-45.7	16.0	29.0-29.7
1957	48.7-49.4	19.2	29.5-30.2
1958	52.9-54.3	22.5	30.4-31.8
1959	59.3-60.8	30.3	29.0-30.5
1960	65.5 c/	34.5	31.0

a. Constructed from data in Tables 1, 2, 3, and 4, pp. 14, 16, 17, and 18, respectively, above.
b. Production at DAZ is based on the two estimates given as residuals in Table 1, p. 14, and Table 4, p. 18. Data for 1953-56 are from Table 4. The lower limit of the range for 1957-59 is the lower limit of the range of the data for the respective years in Table 4, whereas the upper limit of the range is from Table 1. Data for 1960 are from Table 1.
c. The sum of production for DAZ and MTZ given in Tables 1 and 3, pp. 14 and 17, respectively, above.

spare parts probably do not account for 10 to 12 percent of the total value of output of tractors and parts. If DAZ was completed in accordance with the original plan, it has a floorspace of about 420,000 square meters (sq m), or 4.5 million sq ft.*

* The construction of DAZ, which began in 1945, was undertaken for the purpose of producing ZIS-150 trucks at a planned rate of 25,000 units by 1950 and an eventual output of 60,000 annually. Press reporting of the period stated that the plant area would be about 500 acres and would have a total floorspace of 420,000 sq m and 70 industrial buildings. In 1947, plans called for 75 "production units." These units were to include shops for assembly, chassis, engines, body work, springs, wheels, woodworking, instruments, and foundry, forge, and press shops as well as a power station and a gas generator station. Between 7,000 and 8,000 machine tools of various types were to be installed. The chassis shop alone would /footnote continued on p. 20/

occupy 32,000 sq m (344,000 sq ft) and the foundry 37,970 sq m (409,000 sq ft). Some of these buildings undoubtedly were completed according to plan, [redacted] does not permit a clear identification. There presently is one large fabrication assembly type of building, the largest in the plant, that occupies much of one side of the area and has a roof cover of about 440,000 sq ft. A number of other buildings of the same general type but smaller are located nearby. None of the buildings that might be directly involved in production of tractors can be identified.

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At the time MTZ was under construction, a local newspaper reported that the plant would have 32 "shops" and a total production area of 172,000 sq m (1.85 million sq ft). Included in this area were a gray iron foundry of 25,000 sq m (269,000 sq ft), a steel foundry of 20,000 sq m (215,000 sq ft), and a tool shop of 8,000 sq m (86,000 sq ft), which account for one-third of the total floorspace. Seven "gigantic" production buildings, presumably including the foundries described above, were to have a combined floorspace of 62,000 sq m (667,000 sq ft). [redacted] indicate that at least the main buildings of the plant probably were constructed about as planned, with 25 to 30 buildings. [redacted] who obviously were only in the main area of the plant, report that there were 160,000 sq m of floorspace (1.72 million sq ft). [redacted], however, indicates a roof cover of about 2.0 million sq ft in the main plant and another 1.0 million sq ft in what appear to be two extensions in various stages of construction. The assumption that the latter are extensions of the tractor plant may be in error.

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