

INFORMATION REPORT

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SUBJECT Ural-ZIS Automobile Plant near Miass

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1. The Ural-ZIS (Zavod imeni Stalina) Automobile Plant is located about 120 km west of Chelyabinsk, Chelyabinsk Oblast, and about 10 km north of Miass. In the area between Miass and the automobile plant is a double-track electrified railroad line from Chelyabinsk to Bak'kir A.S.S.R. The automobile plant is linked with the Miass railroad station by both a single-track railroad spur, 5 or 6 km long, and a well-surfaced road. Housing projects, designated Novostroyka or Novy Miass, were under construction in the area along the railroad spur and adjoining the plant area on the southeast. These housing projects were built for the plant employees, some of whom were still living in earth shelters, adobe huts, and wooden shacks, as of September 1949. The Miass River, flowing from south to north, ran past the plant on the west. the river was about 200 meters from the plant. A gold mine was in operation in the area west of the plant, but its exact location was not known. Two small, plant-owned, shunting locomotives, several railroad cars, 19 electric trucks, and about 100 motor trucks were used for hauling purposes within the plant area. *

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2. The first installations on the premises of the Ural-ZIS Automobile Plant were built as early as 1939. the original plans called for the construction of a brickyard there. when the German troops approached Moscow in 1941, the machinery and some of the workers of the ZIS Automobile Plant in Moscow were evacuated to Miass. Immediately thereafter, the construction of several new buildings was started and the machinery was installed in these rapidly completed buildings. The first truck produced at Miass was finished as early as May 1942. The Ural-ZIS Plant was constructed in such haste that machines in several workshops were set up on the bare ground. Floors in these buildings had not been laid as late as the end of 1948. there were still tree stumps in some workshops. Some of the walls of the plant buildings were so poorly erected that the continuous reconditioning work required impeded the production of the plant. In early 1949, entire wall sections of the assembly shop collapsed. The construction of the plant was completed by 1945 except for the new boiler house. From 1946 to the end of 1948, new machinery was continuously added and individual machines were replaced. the equipment included machines from the Stoecker Automobile Plant, Stettin which, together

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with the office equipment of the Stoewer Plant, arrived at Miass in 1945 and 1946. Several projects to improve the plant were started in late 1948. Some of the sources observed excavation work in the northern section of the plant area, and [redacted] a new workshop building was completed in July 1949.

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3. [redacted] the plant area covered an area about 1,000 meters square. The actual production departments covered only about 800 x 500 square meters. The plant consisted of a cast-iron foundry; a steel-casting foundry; a nonferrous and light metal-casting foundry; a forge; a tool-making shop; a screw and bolt shop; an engine department with machine shops, a hardening shop, a chromium-plating shop, a final assembly shop, and test stands; a chassis department; a cab and body-building department; and a final truck-assembly department. The brickwork of a building for the engine and chassis-building department was completed by July 1949. [redacted] there were plans to install a second assembly line in the final truck-assembly department. Other plant installations included 2 boiler houses, 1 main transformer station, several auxiliary transformer stations, 1 motor vehicle repair shop, 1 plant maintenance shop, 1 compressor station, 1 oxygen station, 1 sawmill, 1 concrete factory, 1 locomotive shed, and several storage and supply buildings. Prior to 1946, the machinery of the plant was mostly of [redacted] origin. After the installation of machines dismantled in Germany, the machinery was 60 percent [redacted] 35 percent German, and only 5 percent Russian. It was extremely difficult to obtain spare parts for the machine tools. Machine tools were often unusable for periods of several days when one part was broken. The plant was supplied with electric power by a power plant in Chelyabinsk, through the plant's main transformer station. However, the Chelyabinsk power plant was so overburdened that power was often cut off for one or two hours and plant activity was halted. In an effort to relieve the power supply situation, the plant management ordered that the plant be closed on a weekday rather than on Sunday. There was no emergency power generating equipment. [redacted] claimed to have seen a Diesel generator beside the main transformer station. #*

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4. Prior to late 1948, the plant produced a standard ZIS truck of 60 to 70 hp. Some of these trucks, called the ZIS-5 were designed to operate on gasoline and some, known as the ZIS-21, were designed to operate on gas generated from wood. ZIS-120 engines of 95 hp started arriving from Moscow in shipments of various sizes at the end of 1948. [redacted] these engines arrived at a rate of 80 to 90 per month in early 1949 and at a rate of 400 per month in the fall of 1949. The engines were installed in ZIS trucks built in the plant. The trucks, [redacted] referred to as ZIS-150s and [redacted] referred to as ZIS-50s, and which had gasoline engines and no bodies, were delivered to the Soviet Army. [redacted] these trucks were used to mount so-called Stalin organs (multiple rocket launchers). The ZIS-5 and ZIS-21 trucks produced in this plant were delivered for industrial and agricultural use. Wood-gas burning trucks were built at a rate varying between 10 and 30 percent of the total truck production. Modifications, such as a change in the shape of the cab, the gas generating container, and other truck components, were observed at the end of 1948. A new type of truck, which was referred to as the ZIS-100 [redacted] was scheduled for production in late 1949 or early 1950. In addition to producing trucks, the plant supplied ZIS-5 engines and engine spare parts to other plants. It was estimated that about 50 percent of the engines made at the Ural-ZIS Plant in 1947, and from 25 to 30 percent of those made in 1949, were delivered to other plants. [redacted] in 1949 about 20 percent of all the engine parts produced were for spare parts. The production figures fluctuated considerably. The production was adversely affected by the frequent power failures, the coal

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shortage, the high percentage of waste in the foundry and the parts shop, and by the irregular and insufficient supply of parts made by other plants. Parts supplied to the Ural-ZIS Plant consisted mostly of rims and tires, but also included mudguards, radiator hoods, spark plugs, and ball bearings.

in an effort to maintain steady production in the final assembly shop, parts of trucks, especially tires and wheels, were removed from finished trucks and mounted on trucks on the assembly line. the production of trucks of all types was as follows:

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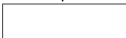
	Number of Trucks Produced Daily	Number of Trucks Produced Monthly
Early 1944	5 to 8	
Late 1944	12	
Early 1945	12	
Late 1945	17 to 22	
Early 1946	18 to 20	
Late 1946	18 to 24	
Early 1947	25 to 35	
Mid-1947		800 to 900
Late 1947	35 to 50	
Early 1948	50 to 60	
Mid-1948		1,200 to 1,500
Late 1948	65 to 70	
Early 1949	70 to 80	1,700 to 1,800
Mid-1949	80 to 90	1,800 to 1,900

The production plans called for the construction of 100 trucks per day at the end of 1949; 3,000 trucks per month in 1950; and 6,500 trucks per month in 1952. By the fall of 1949, engines were manufactured at a rate of from 2,500 to 2,700 per month.

- 5. Raw materials, accessories, and parts which the Ural-ZIS Plant received from outside included coal from Kopeysk near Chelyabinsk; coke; peat; gasoline; oil; a sirup-like liquid used in molding; pig iron and steel bars from a metallurgical plant at Chelyabinsk; light metal and nonferrous metal bars; scrap steel; wood; plywood; cotton and springs for upholstery work; glass; electrical equipment, such as generators and lights, and carburetors from Moscow; ball bearings; armatures; batteries; tires; and water pump components. The majority of the parts for trucks and engines were supplied in a semifinished state by the KP-ZIS (Kuznechno-Pressovoy Zavod imeni Stalina) (Stalin Forging and Pressing Plant) Plant. They included mudguards, radiators, radiator hoods, floor plates, gasoline tanks, components for gas generators, oil pans, springs, rims, chassis sections, axles, crankshafts, camshafts, piston rods, valves, cogwheels, bevel wheels, shift levers, hand brakes, and starting cranks. In addition, the Ural-ZIS Plant received from Moscow finished engines for trucks scheduled for delivery to the Soviet Army. Incoming shipments of raw materials and automobile parts were so scarce and irregular that it was impossible to maintain a systematic stockpiling and there were frequent production stops due to delays of supply shipments.

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- 6. [redacted] the individual who was plant manager prior to 1947 was later appointed Minister of the Automobile Industry. The plant manager from 1948 to September 1949 was one Tsynitsyn (fnu). The chief engineer in September 1949 was one Belin (fnu) and his assistant was one Karlin (fnu). [redacted] there were from 10,000 to 12,000 employees in the production departments in mid-1949. In the majority of the plant departments, three 8-hour shifts were worked. A few departments worked only two shifts. From 40 to 50 percent of the workers were women. 50X1-HUM
- 7. The plant area was surrounded by a board fence, 2 meters high, with watchtowers, and was guarded by armed plant police. 50X1-HUM

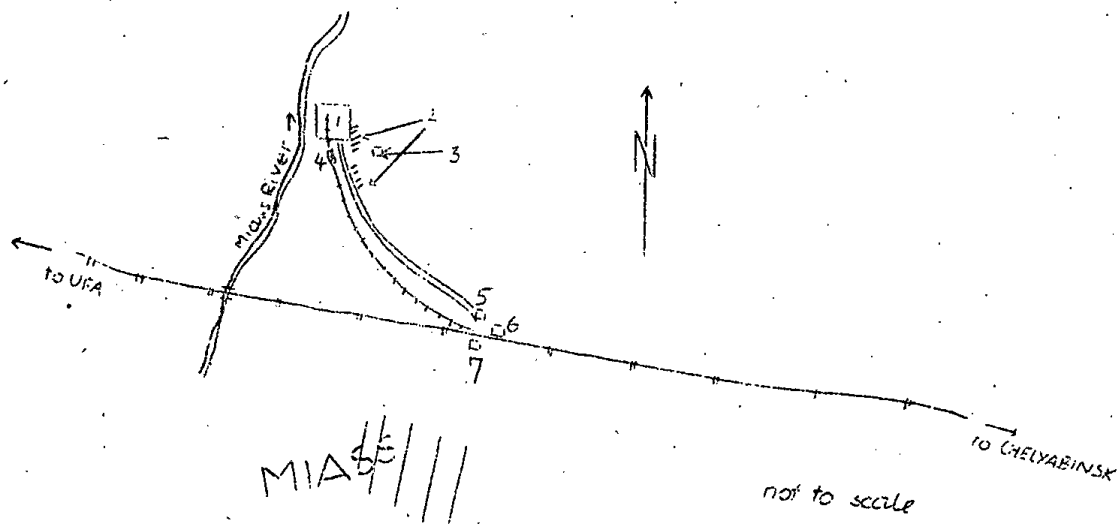
* [redacted] Comment. For a location sketch of the automobile plant, see Annex 1, based on information from the PNs. [redacted] did not agree as to whether the town of Miass is connected with the trunk line by a railroad spur. 50X1-HUM

** [redacted] Comment. For a layout sketch of the automobile plant, see Annex 2. [redacted] For detailed sketches of Foundries Nos 1 and 2, the steel and nonferrous metal casting foundries, the iron-drawing shop, and the engine department, see Annexes 3, 4 and 5. These sketches [redacted] 50X1-HUM

[redacted] 50X1-HUM

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Location Sketch of the Ural-ZIS Automobile Plant near Miass



Legends:

- 1. Ural-ZIS Automobile Plant.
- 2. Novo-Stroyka Settlement, under construction.
- 3. PW Camp.
- 4. Plant railroad station and loading ramp.
- 5. Mill.
- 6. Miass railroad station.
- 7. Transformer installation for the electrified railroad.

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Attachment 2

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Legend:

1. Oxygen filling station, completed in the fall of 1943. No oxygen was produced in the plant.
2. Locomotive shed, in operation since May 1946. The plant-owned shunting engines were sheltered and repaired there.
3. Maintenance shop for the transportation facilities of the plant. It included a welding shop; a small foundry for nonferrous metals; a machine shop with 3 drilling machines, 1 valve-grinding machine, 2 lathes, 2 turret lathes, and several small machine tools for precision work.
4. Storage shed for lime, cement, gypsum, and other building materials.
5. Old sawmill with 2 saw frames and about 20 wood-working machines.
6. Small boilerhouse with 2 boilers used to operate the sawmill; fired with sawmill waste and peat.
 - a. Steam pipes.
 - b. Smokestack.
7. Water tower.
8. Railroad operations office.
9. Kitchen and mess hall.
10. Storage site for machinery dismantled from the Stoeber Plant, Stettin.
11. Loading ramp.
12. Storage site for tires.
13. Storage site for iron and steel wool.
14. Storage site for unfinished parts supplied by the KP-413 Plant, Chelyabinsk.
15. Storage sheds for parts:
 - a. Small components, such as speedometers.
 - b. Small metal parts.
 - c. Work clothing.
 - d. Tires and tubes.
 - e. Engines, both those produced in the plant and those delivered from Moscow.
16. Pattern-making shop and electrical repair shop:
 - a. Carpentry shop for wood patterns.
 - b. Manufacture of aluminum patterns for pistons, bushings, door fittings, water pumps, cylinder heads.
 - c. Charging station for batteries of electric cars and trucks.
 - d. Repair shop for electric cars.

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[REDACTED]
Attachment 2

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17. Loading ramp.
18. Storage shed for engine parts, screws, and bolts.
19. Fuel storage installation consisting of several large tanks.
20. Storage shed for parts for gas generators, radiator hoods, floorplates, radiators, and wheel rims from Chelyabinsk.
21. Storage site for coke.
22. Storage site for scrap.
23. Firebrick factory with 2 concrete mixing machines, 2 automatic brick presses, 2 conveyor belts leading to the drying installation, and a section producing large firebricks.
24. Screw, bolt, and nut department, iron-drawing shop, grinding shop, casting-cleaning and hardening shop, and repair shop.
 - a. Screw, bolt, and nut department with 40 automatic index dies (Index-Automaten), 3 or 4 drilling machines, 1 large and 2 small grinding stones. Screws, bolts, and nuts were pressed both hot and cold.
 - b. Screw-making shop equipped with 4 screw presses, 1 three-ton heading machine, 20 automatic screw machines, 12 thread presses. [REDACTED] a screw-press operator had to produce a fixed quota of 600 roundhead screws or 600 spring bolts during one shift in late 1948. Some of the items produced in the screw-making shop were delivered to other plants.
 - c. Iron-drawing shop equipped with 1 acid bath, 4 drawing benches, 3 straightening machines, 4 pointing machines, 2 lathes, 4 circular iron saws, 2 pendulum saws, 1 planing machine, 1 cutting machine, 1 exhaust-pipe bending machine, 3 electrically heated annealing furnaces, 2 oil-fired annealing furnaces, 1 grindstone, and 1 testing stand.
 - d. Office.
 - e. Machine shop equipped with 25 lathes, 2 grinding machines, 1 oscillating drum for cleaning screws, 1 machine knife (Maschinen-Messer), several boring machines, and grindstones, a supply room for spare parts, and a testing shop. The shop also produced screws and nuts, as well as some unidentified items.
 - f. Casting-cleaning and grinding shop equipped with 2 or 3 revolving sheet-steel drums used to clean castings; 14 grinding machines, 1 straightening machine for differential casings, 1 straightening machine for brake shoes, 1 straightening machine for flywheels, 1 straightening machine for rear axles. All the straightening machines were operated by compressed oil (Oeldruck).
 - g. Hardening shop with 3 or 4 electrically heated furnaces and oil baths.
 - h. Testing shop used to test the compressive and tensile strength of cast parts.

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Attachment 2

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- i. Machine shop, used to repair machine tools. The equipment included 3 large lathes, each with a table length of 12 meters.
 - k. Armature-winding shop.
25. Compressor station with 2 compressors, and transformer station.
26. Foundries Nos 1 and 2 and molding shop.
- a. Storage shed for coke and lime.
 - b. Material-testing shop.
 - c. Kitchen and mess hall.
 - d. Foundry No 1 for steel casting.
 - e. Foundry No 2 for nonferrous metals and special steels.
27. Engine department.
- a. Processing of single parts and final assembly.
 - b. Final assembly line.
 - c. Assembly line for transmission components.
 - d. Engine test shop with 30 test stands.
 - e. Hardening shop.
 - f. Laboratory and parts-testing office, sand blast equipment and chromium-plating shop.
 - g. Telephone exchange, electrical workshop, mechanics' shop and supply rooms on the first floor. The plant administrative offices were on the second floor.
28. Chassis department and final truck assembly.
- a. Wood-working section (Derevo Obdelochyy Tsekh) (DOT) in which truck bodies, components for truck cabs, truck seats, etc. were produced. Its equipment included 2 saw frames, 4 planing machines, 2 combined wood-working machines, 3 circular saws, 3 band saws, 4 milling machines, 5 drilling machines, 1 multiple-spindle drilling machine, 2 parts-cutting machines, and 1 frame press. [redacted] in early 1949, 30 cubic meters of wood was consumed per day in this section.
 - b. Repair section for machine tools of the chassis-building and final assembly departments. Its equipment included 3 lathes, 3 milling machines, 1 shaping bench, 2 drilling machines, 1 cylindrical grinding machine, and straightening plates.
 - c. Hardening section for chassis components, axles, and cogwheels. Its equipment included 6 oil-fired annealing furnaces. There was also a testing shop with machines for testing compressive and tensile strengths.
 - d. Experimental section where the following projects were observed in mid-1949:

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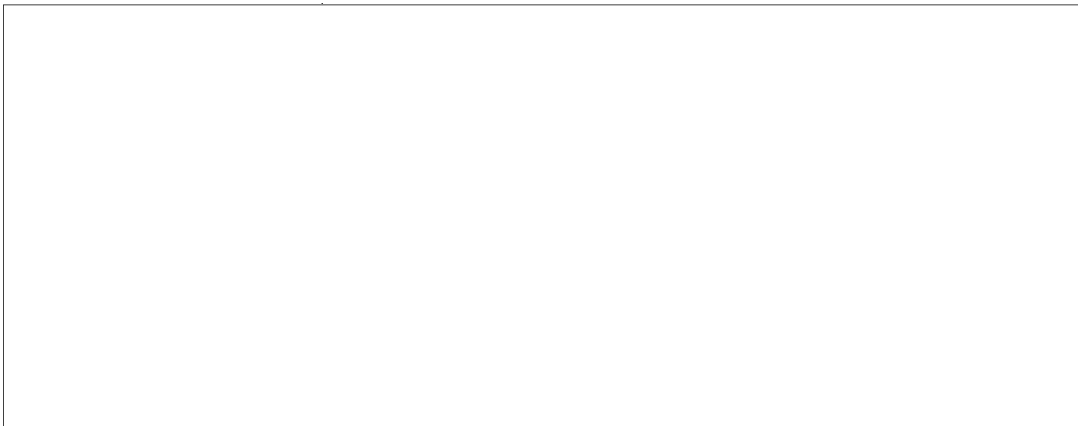
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- g. Storage facilities for component parts.
 - h. Electrical workshop.
 - i. Mechanics' shop.
 - k. Machine shop, used to process chassis components, such as axles, springs, steering gears, frame parts, differential gears, and gimbals (Kardan). Its equipment included 250 drilling machines, 100 milling machines, 70 lathes, 30 grinding machines, including 8 special grinding machines, 10 fully automatic boring-and-turning mills, 13 fully automatic machine tools, and 15 drawing benches.
 - l. Chassis assembly section. The chassis frames were riveted rather than welded. The production quota per shift in July 1949 was said to have been 35 frames.
 - m. Final truck assembly with an assembly line running the entire length of the workshop. The equipment included 5 electric cranes and from 15 to 20 machine tools. The assembly line was capable of handling as many as about 20 trucks at a time. The assembly of cabs, radiators, and loading frames; the upholstering of seats; and the installation of armatures and windshields were done on an elevated platform in the workshop building. The equipment there included several machine tools, 2 German spot-welding units, and 2 trolley cranes. Upon assembly, the truck bodies were lowered to the ground floor by cranes.
 - n. Spray-painting shop for finished trucks.
 - o. Filling station.
29. Clothing supply room.
30. New workshop under construction which, , was to be added to the chassis and engine-building department. No machinery had been installed in the workshop as of July 1949. 50X1-HUM
31. New workshop under construction in September 1949.
32. Sawmill.
33. Storage site for boards and planks.
34. Construction office.
35. Storage site for nonferrous metals.
36. Storage site for molding sand.
37. Coal pile.

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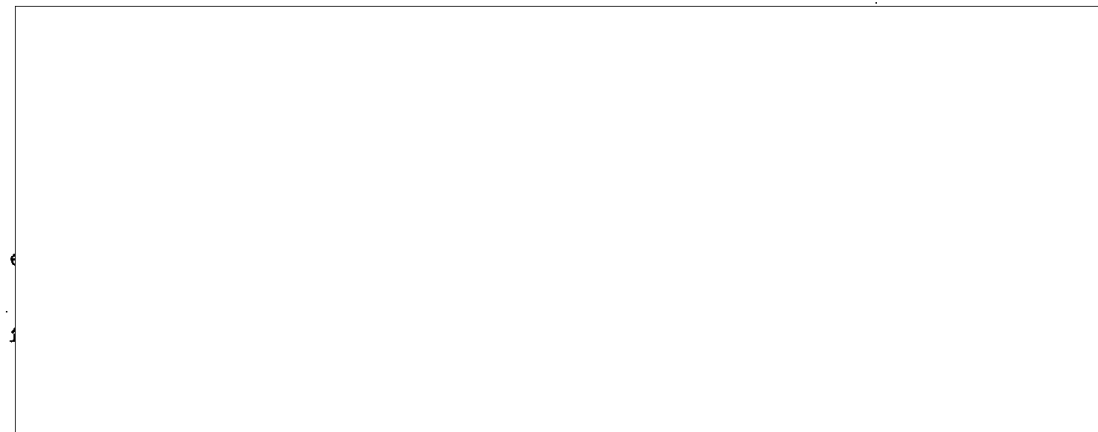
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 - n. Spray-painting shop for finished trucks.
 - o. Filling station.
- 29. Clothing supply room.
 - 30. New workshop under construction which, according to a Soviet foreman, was to be added to the chassis and engine-building department. No machinery had been installed in the workshop as of July 1949.
 - 31. New workshop under construction in September 1949.
 - 32. Sawmill.
 - 33. Storage site for boards and planks.
 - 34. Construction office.
 - 35. Storage site for nonferrous metals.
 - 36. Storage site for molding sand.
 - 37. Coal pile.

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38. a. Foundry No 3 for cylinder blocks, cylinder heads, gearboxes, brake drums, clutch plates, clutch housings, and various other small parts. The equipment of the foundry included 4 open-hearth furnaces of from 25 to 30 tons capacity. The furnaces were tapped once each shift. The daily production was estimated at from 120 to 150 cylinder blocks in July 1949. From 30 to 50 percent of the cylinder blocks and the other parts allegedly had to be rejected because of defects. Some of the rejected material, such as cracked gearboxes, were made serviceable by welding. The workshop contained a coremaking shop, a hand-molding shop, sand mills for molding sand, a casting-cleaning shop, and a grinding shop. Three or four conveyor belts were used in the casting process.
- b. Stocks of raw materials.
39. New boilerhouse with 4 boilers, 2 of which were in operation by August 1949. The other two were being installed.
- a. Brick smokestack, 45 meters high.
- b. Coal elevator and coal crusher.
- c. Conveyor belt.
- The boilerhouse supplied the plant with steam for heating and power. The steam used for power had a pressure of 25 to 26 atmospheres. The installation had been built by an American firm.
40. Old boilerhouse with 4 boilers, 1 of which was new. The other three were old and had no shaking grates. The boilerhouse generated steam for heating.
- a. Smokestack, 50 meters high.
- b. Coal elevator.
- c. Conveyor belt.
41. Forge equipped with 3 electric five-ton hammers, 3 five-ton steam hammers, 4 oil-fired annealing furnaces, 1 butt welder, and 3 or 4 ceiling cranes of 1.5 to 2-ton capacity each. Truck components, such as axles, as well as tools and machine tool parts were processed in the forge.
42. Tool shop which, [redacted] was equipped with 150 machine tools of all types. The shop produced tools such as lathe tools, milling tools, drills, reaming bits, slide gauges, measuring instruments, and spare parts for machine tools. Machine tools were also repaired there. The upper floor of the building contained offices, drafting rooms, and supply rooms.
43. Kitchen and mess hall.
44. Garage.
45. Motor vehicle repair shop equipped with several machine tools, a welding shop, a small forge, and a carpentry shop.
46. Main transformer station.
- a. Barbed-wire fence.
- b. High-tension lines.

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Attachment 2

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47. Parking lot for finished trucks.

48. Garden plot.

a. Fountain.

b. Memorial plate.

49. Guardhouse.

50. Plant roads.

51. Railroad tracks.

52. Board fence.

53. Garden plot.

a. Stalin monument.

54. Office building.

55. Two large oil tanks.

56. Plant railroad station.

57. Loading ramp.

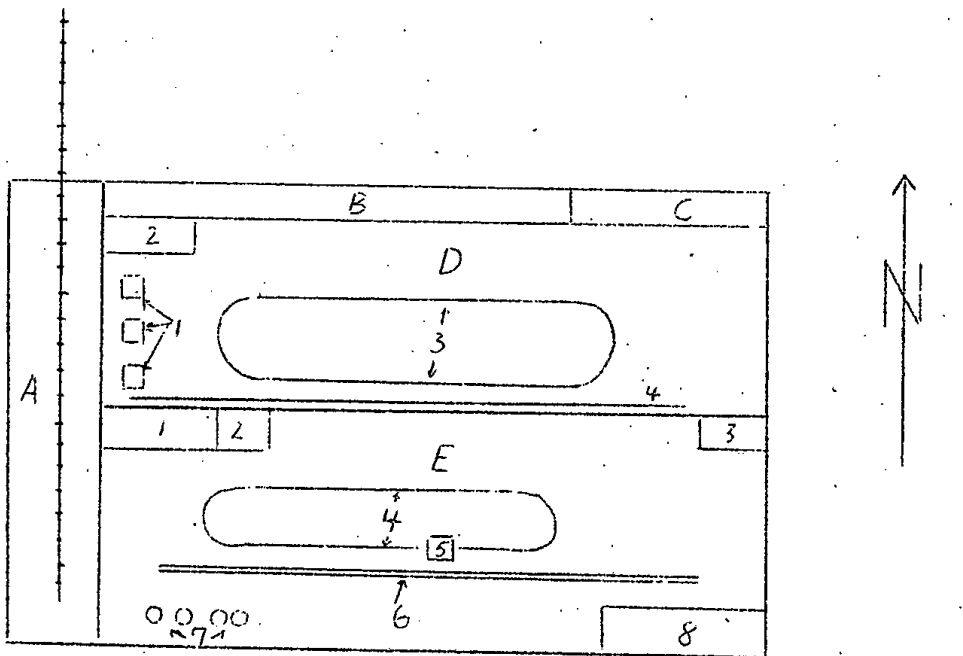
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Attachment 3

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Layout Sketch of Foundries Nos 1 and 2 of the Ural-ZIS Automobile Plant near Miass



not to scale

Legend: See next page.

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Attachment 3

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Legend:

- A. Storage sites for coke and lime.
- B. Material-Testing shops.
- C. Kitchen and mess hall.
- D. Foundry No 1, for steel castings:
 - 1. Three open-hearth furnaces, of 60-ton capacity each.
 - 2. Molding shop.
 - 3. Electrically operated conveyor belt for molds.
 - 4. 1.5-ton traveling crane.

This foundry produced rear axles, differential casings, wheel hubs, oil pans, brake shoes, various transmission parts, and pedals.

- E. Foundry No 2, for nonferrous metals and special steels.
 - 1. Hand-molding shop No 1.
 - 2. Casting-cleaning shop equipped with 2 air hammers.
 - 3. Repair shop, equipped with 1 lathe and other machinery.
 - 4. Hand-operated conveyor belt for molds.
 - 5. Oscillating grate (Schuttelrost).
 - 6. 5-ton traveling crane.
 - 7. One large and 2 or 3 small, 0.5-ton electric furnaces for aluminum, brass, and nickel steel castings, such as piston rings, valves, aluminum parts for gasoline pumps, bearing raceways, and brass bushings.
 - 8. Hand-molding shop No 2.

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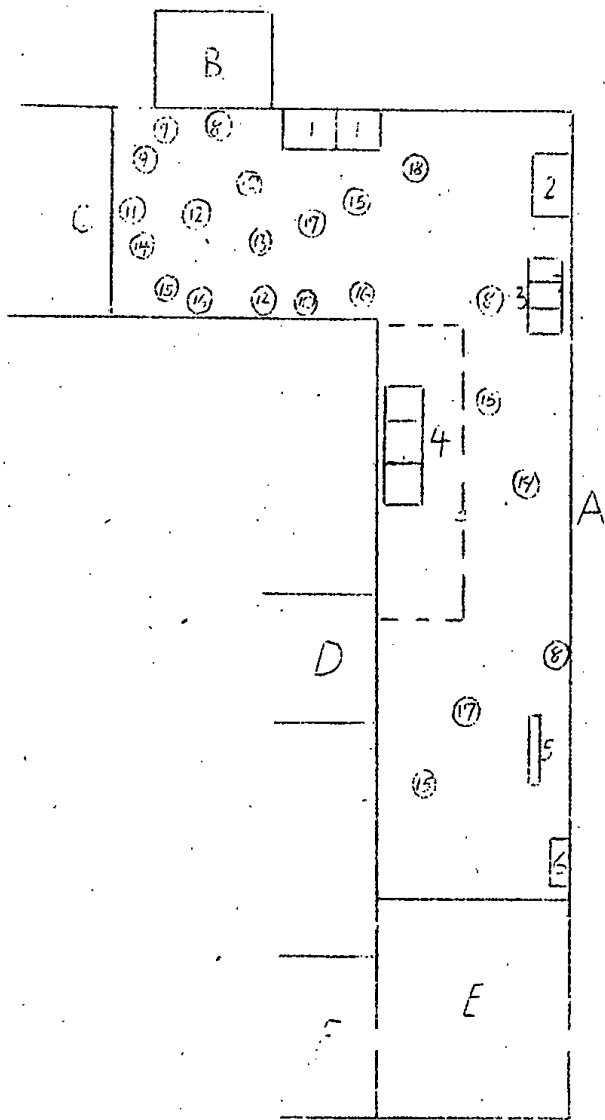
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Attachment 4

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Layout Sketch of the Iron-Drawing Department of the Ural-ZIS Automobile Plant near Miass

Legend: See next page.



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Attachment 1

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Legend:

A. Iron-drawing department.

1. Acid bath, divided into two wooden basins filled with sulfuric acid, used to clean iron prior to the drawing process.
2. Test stand, used to examine products prior to leaving the department, equipped with an electrical testing device (sic).
3. A large oil-fired annealing furnace with two small trucks used to load the furnace with items to be annealed, such as metal, wire and bars for nuts, bolts, and screws.
4. Three electrically heated annealing furnaces, separated from the other departments by a wire fence (a).
5. An old German exhaust pipe bending machine, electrically operated, used to bend pre-cut exhaust pipes.
6. Small oil-fired annealing furnace, not in operation.
7. German lathe, used for repair work.
8. Three straightening machines, used to straighten the drawn material. One of the machines was usually out of operation.
9. Soviet lathe used for shaping pipes.
10. Two German pendulum saws (Pendelsaegen), used to cut bars, pipes, and pieces for cotter pins.
11. A German iron-planing machine for repair work.
12. Two Soviet circular saws, with small blades, used to cut bars and other materials for the chassis department. Only one of the saws was in operation.
13. One grindstone with two stones, used to smooth sawed-off edges.
14. A Soviet drawing bench, with a drum for wire, used in the manufacture of screws and bolts. A quota of 5 tons per shift was set for this department and as many as 6 tons of material were processed per shift in mid-1949.
15. Four Soviet pointing machines (Anspitzmaschinen), each belonging to a draw bench, used to point material to be drawn.
16. Two Soviet circular saws with large blades, used to cut exhaust pipes, bushings, and stamped parts.
17. Two Soviet 20-ton drawing benches for rods. In mid-1949 each bench produced only one ton of processed material per shift although the quota was two tons per shift.
18. A cutting machine used to cut brake rods.
19. A Soviet 50-ton drawing bench for rods. In mid-1949, this bench was producing its quota of 6 tons per shift.

B. Annex building containing offices.

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Attachment 4

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G. Screw and nut department.

D. Machine shop.

E. Thermal department.

F. Grinding shop.

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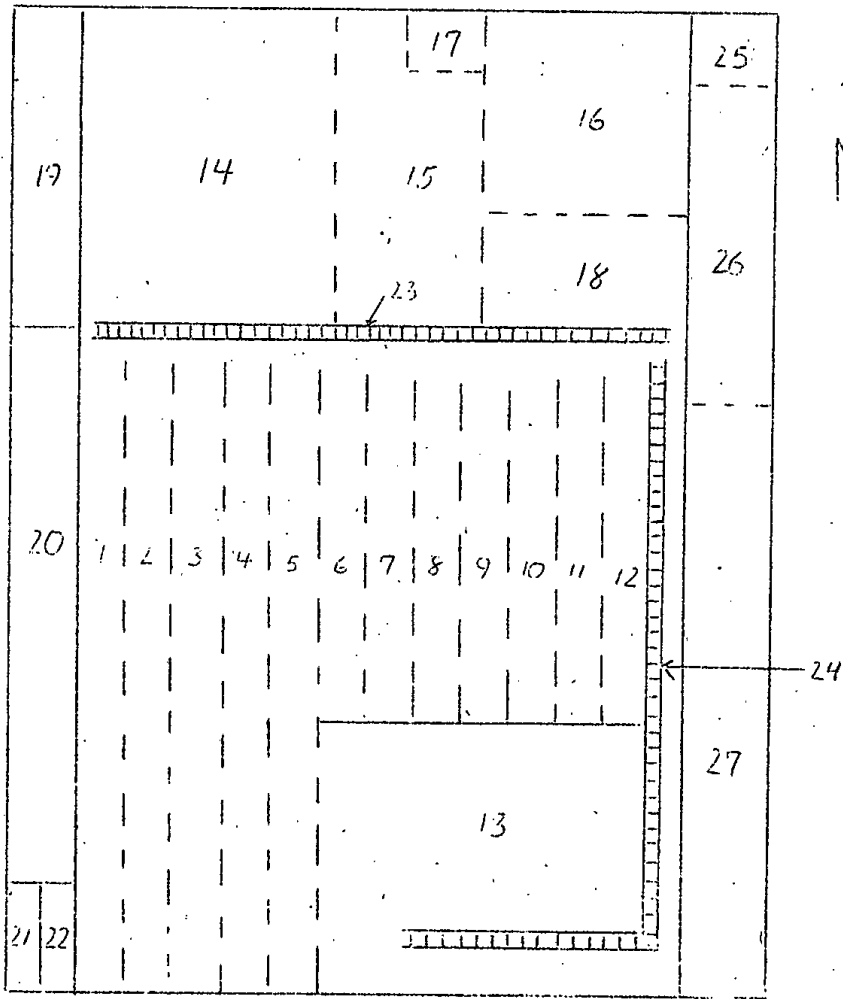
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Attachment 5

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Layout Sketch of the Engine Department of the Ural-513 Automobile Plant near Miass

Legend: See next page.



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Attachment 5

2

Legend:

1. Processing of pistons and piston rings.
2. Processing of connecting rods and connecting-rod bearings.
3. Processing of crankshafts.
4. Processing of gear-shift rods (Gangschaltorn).
5. Processing of camshafts.
6. Processing of shafts and casings for connecting the engine and water pump.
7. Assembly of oil pumps.
8. Processing of cogwheels for crankshafts.
9. Processing of cogwheels for camshafts.
10. Processing of cylinder heads (Motorblock-Deckeln)
11. Processing of exhaust pipes.
12. Processing of clutch plates and linings.
13. Processing of transmission parts.
14. Processing of cylinder blocks, including crankshaft bearings, crankshaft bearing covers, valves, flywheels, and flywheel casings.
15. Production of piston pins, water pumps, oil filters, ventilator shafts, and engine mountings.
16. Twenty test stands, on which the engines ran for only one hour, instead of the prescribed two hours.
17. Storage room for finished engines.
18. Mechanics' shop (Schlosserei).
19. Hardening shop, where materials were hardened electrically and by annealing with subsequent quenching in an oil bath. The shop was equipped with 3 annealing furnaces and 1 transformer station.
20. Testing shop.
21. Sand-blast equipment.
22. Chromium-plating and copper-plating shop, allegedly equipped with 5 furnaces.
23. Main assembly line for the final assembly process.
24. Conveyor belt for transporting transmission parts.
25. Telephone exchange for the plant.
26. Laboratory and testing section for defective engines.
27. Tool shed, electrical workshop, and mechanics' shop, on the ground floor. The administrative offices were on the upper floor.

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