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CENTRAL INTELLIGENCE AGENCY

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THIS IS UNEVALUATED INFORMATION

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1. The Ilyich Plant, located on the north bank of the Neva River in the Vyborg District [redacted] of Leningrad, up until 1932 produced mainly natural abrasive materials. However, after 1932 the production of electrocorundum and silicon carbide (carborundum) was increased until today it makes up the main portion of production of the plant. The reprocessing of natural abrasives has been limited in production to materials for fine polishing and finishing operations (super-finish, polishing, lapping, honing).

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2. The following artificial abrasives are produced at the Ilyich Plant:
   a. Electrocorundum, normal (Al_2O_3 - 87 to 97%)
   b. Electrocorundum, white (Al_2O_3 - 98 to 99%)

   Note: Black electrocorundum (Al_2O_3 - 75 to 85%) as obtained by melting bauxite of a low silicon content without dioxidation agents is not produced for industrial use. White electrocorundum is produced in an amount equal to about 20% of normal electrocorundum.

   c. Black silicon carbide (SiC - 95 to 98%)
   d. Green silicon carbide (SiC - 97 to 99%)

   Note: Green silicon carbide is produced in an amount equal to about 15 to 20% of total production.

   e. Rouge (iron oxide)
   f. Crushed glass

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3. The following natural abrasives are used at the plant for production of abrasives: corundum, emery, granite, pumice. These were used in making the following:
   a. Grinding discs of different sizes, grain, hardness, structure and binding.

   Note: About 80% of the discs produced are made by pressing on a ceramic binding. Molten discs are no longer produced. The remaining 20% are pressed on bakelite and vulcanite bindings. The discs pressed on silicon and magnesian bindings are produced in very small amounts, usually on special order.

   b. Segments for combination discs used for flat polishing.
   c. Grinding bricks for honing-process and super-finish.
   d. Various hand files and plates.
   e. Abrasives with a grain varying from #5 to #500.
   f. Paper and linen abrasives (cemented) of emery and sandpaper.
   g. Various abrasive powders and pastes.

4. The main produc... of the Ilyich Plant, however, is grinding discs and bricks for ...hine finishing. Grinding discs are also produced at the Chelyabinsk, Zlatoustov and "Smychka" plants. Various abrasive discs and paper, linen, pastes and powders from natural abrasives are produced by some cooperative organizations and artels as well as in the plants belonging to the "Union Graphite-Corundum Trust", such as the Techinsk and Kyshtym plants.

5. Because there are no diamond deposits in the USSR, all diamond abrasives are imported. (Diamonds found in the Ulal [Ulala] and Enisseysk [Krasnoyarsk] districts are a mineralogical rarity.) Because of this fact, wherever possible, diamonds are replaced by durable, hard metals. For example, diamond tools for fine grinding are replaced by T15k6C, T60k6, etc; diamond drills by wolomit... (94% W [or D], 4% C, 2% Fe - hardness, 9.8 by Moh's scale). ...ar carbi... [pure corundum] the hardest material known next to the diamond, did not have any practical significance, since its production and use did not occur beyond the limits of laboratory tests and some factory experiments. Current literature, however, mentions that after World War II the "bar" carbide began to be used in mass production. Its application is still limited to finishing jobs and finishing instruments of hard metal. It is difficult to learn whether "bar" carbide is being produced in one of the above mentioned plants [redacted] 50X1-HUM

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6. The machine building department of the Ilyich Plant has a small building section and fairly good mechanical shops. The department produces simple one and two sided polishing headstocks for the hand finishing of tools, universal machines for grinding various instruments and tools and specialized grinding machines for sharpening chucks, spiral drills, etc.

7. The plant occupies a fairly large area (one to 1½ km square). Most of the buildings are of one story; a few are two stories. The buildings housing the electro-furnaces and plant management have four stories. A large area is given over to unloading and stocking of raw materials. The entire plant area is criss-crossed with a transportation system [redacted] 50X1-HUM

8. The equipment in the mechanical repair shop is very old and in poor condition from neglect. The equipment in the mechanical shops of the machine building department is fairly new and well chosen for the production of grinding machines. The equipment in the shops for reprocessing abrasives is the worst in the plant. It is varied, about one-half being worn out and of old make. Despite this [redacted] 50X1-HUM the plant receives much attention and in the past, old, worn out equipment was being replaced as quickly as possible. By now the equipment is probably in excellent shape - at the expense of East German industry.

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9. The plant has four, low-charge electrode furnaces for melting electrocorundum and one (possibly two) electric furnaces with a heated core for melting silicon carbide. Two electric furnaces for corundum were installed around 1935. They have a moveable base which is placed on a pushcart. Meltings are made "on block" with a closed charge hole. The size of the molten block is about two or 2½ meters in diameter and about the same in height. Melting "on release" is not made at all. Two other electrical furnaces for corundum were installed around 1931. They have stationary bottoms and the size of the block is less than two meters (diameter). The electric furnace used for silicon carbide was installed in 1930 - 1931. It is built on a firebrick base. The side walls can be dismantled after each melting. The full capacity of this furnace is about 60 tons. The maximum amount of carbide obtained from one melting is: black, up to 10 tons; green, up to five tons. The black carborundum is the main production since the melting process of the green carborundum is more expensive, requires greater electric power consumption (for one ton of black carborundum, up to nine thousand kw/hr; for green, up to 12 thousand kw/hr) and three to four tons of cooking salt for each melting. The problem of obtaining salt in the USSR is unsoluble. To accomplish the norms set for production, it is more advantageous to produce the black carborundum since with the same charge, the output of black is almost twice that of green carborundum. Therefore, the plant is trying to limit the production of green carborundum to the 2% which is formed at the core on each black melting.

10. [redacted] before World War II the carborundum output was 18 thousand tons (metric) in blocks (113 thousand tons in grain). This was for both the Ilyich and the Chelyabinsk plants since these were the only two plants in production 50X1-HUM

11. The Ilyich Plant uses mainly the Tikhvinsk bauxite, although the quality is lower than the Ural bauxite. According to Soviet standards the coefficient of bauxite (siliceous modulus - $\frac{Al_2O_3}{SiO_2}$) must be between seven and 10. The Tikhvinsk bauxite coefficient does not exceed 7.8, but because the Tikhvinsk supply is nearby (and Soviet transportation difficulties are always present) it led to the maximum use of Tikhvinsk bauxite. Attached is a table of the basic components of Tikhvinck and Ural bauxite. (The bauxites are placed according to decreasing siliceous modulus ($\frac{Al_2O_3}{SiO_2}$)

12. Quartz and sand are delivered to the plant from the Leningrad area. A better quality (than Leningrad) is also brought from Karelia /Karelo-Finnish Soviet Republic/. Natural corundum is obtained from Semiz-Bugu in the Kazakh area. Corundum is also found in Yakutia /Yakutsk/ along the Chainyga River /sic/ /Chainguja or Khaiyngyya/ but it is too far from Leningrad to be transported efficiently. Emery is obtained from the Priirtysh Mines near Kyshtym in Chelyabinsk. This emery contains from 20 to 60% of corundum. Granite (almandine) is obtained from Karelia (Finnish SSR) and a very good grade comes from the Urals. Pumice is brought from Armenia and the North Caucas region.

13. As a rule the Ilyich Plant processed all raw materials, but in the late thirties crushed corundum began to be produced at the Kyshtym plant of the Union - Graphite - Corundum Trust and crushed emery at the Techinsk plant of the same trust. 50X1-HUM

14. [redacted] the source of power for the Ilyich Plant [redacted] it is either the Dubrovinsk power plant on the Neva River or the Volhov hydroelectric plant. There are no other possibilities. The electric furnace charges are placed usually during the night-time when the electric power consumption of other enterprises is reduced. 50X1-HUM

[redacted]

15. The plant worked on three shifts. On the day shift there were about five hundred workers, two hundred on the evening and one hundred to 150 on the night - morning shift. (These figures are exact for the years 1936 - 1937.) Women made up about 15% of all workers, doing mostly plant administration work or cleaning. The administrative section was very large, as is common in the Soviet. (A typical example is the case of the [redacted] power plant taken by the Soviets [redacted] The Soviets replaced them with 42, 30 of them being put in the administrative section.)

16. The director of the plant in 1937 was one (fnu) Gabulov, an old Party member [redacted] The technical manager was one G M Ippolitov, who was not a Party man. [redacted]

17. Up until 1935 the production of the plant was of very low quality. The crystallization of the abrasives was not large enough, was of the wrong isometric form and large amounts of impurities were present. In crushing, the grains came out in swordshape and thin, leaf-like forms. The ceramic bases were very brittle and the discs were not homogeneous. The stamping of discs did not always correspond to their real qualities. However, with the help of the Leningrad Chemistry - Technology Institute and Tsnilash (Central Scientific Research Laboratory of Abrasives and Polishing) these difficulties were overcome, with the result that by 1938 the quality of production was rather good. However, for the important, responsible jobs, particularly in war (defense) plants, the imported discs were preferred. In general, the production of the Ilyich Plant was for internal use and only a small percentage of selected and tested discs were exported, [redacted]

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ENCLOSURE (A): Table of Tikhvinsk and Ural Bauxites.

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ENCLOSURE (A)

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TABLE OF TIKHVINSK AND URAL BAUXITES

Origin	Mineralogical Characteristic	Composition of Basic Components in Per Cent: Al_2O_3	SiO_2	Fe_2O_3	FeO	TiO_2	CaO	$\frac{Al_2O_3}{SiO_2}$	Temperature - °C. Softening	Melting
North Ural	Diasporous	77.4	0.88	2.1	--	3.12	0.70	88.0	1860	1945
North Ural	Diasporous	59.9	0.85	23.8	2.21	2.60	1.03	70.0	1705	1790
North Ural	Diasporous	55.1	1.12	28.8	--	2.43	0.64	49.2	1650	1730
North Ural	Bementite	57.6	2.64	22.0	1.05	3.0	0.95	21.9	1690	1755
North Ural	Diasporous	63.7	3.6	11.3	2.44	2.65	1.2	17.7	1730	1820
North Ural	Diasporous	52.6	3.26	28.5	--	2.37	0.76	16.1	1600	1650
South Ural	Bementite	56.6	3.91	21.23	1.72	3.75	1.10	14.2	1595	1735
North Ural	Diasporous	56.9	4.08	23.0	--	2.29	0.86	14.0	1580	1630
North Ural	Diasporous	59.26	4.52	19.01	--	2.32	0.84	13.1	1630	1700
North Ural	Diasporous	61.94	5.88	10.41	6.48	2.62	1.02	11.4	1670	1730
North Ural	Diasporous	55.5	6.12	21.3	--	2.17	0.70	9.1	1650	1730
South Ural	Bementite	55.2	6.86	16.8	5.72	3.10	1.10	8.3	1565	1640
Tikhvinsk	Bementite	51.25	6.6	26.2	0.86	1.80	1.39	7.8	1580	1675
Tikhvinsk	Bementite	57.5	7.54	18.4	--	3.21	1.30	7.6	1575	1680
North Ural	Diasporous	54.12	7.74	20.1	--	2.23	0.90	7.0	1595	1710
Tikhvinsk	Hydrargillite-Kaolinite-Calcite	44.2	7.22	18.7	--	1.43	8.2	6.1	1500	1640
North Ural	Diasporous	50.2	9.16	23.5	0.43	2.37	0.65	5.5	1580	1650
Tikhvinsk	Bementite-Kaolinite	46.5	10.1	20.4	--	3.83	4.80	4.6	1525	1640
North Ural	Diasporous	46.96	12.1	22.4	--	2.45	0.94	3.9	1560	1590
Tikhvinsk	Bementite-Kaolinit	46.1	13.1	25.5	--	2.57	0.63	3.5	1545	1600
North Ural	Kaolinite-Diasporous	43.8	14.0	26.4	--	2.17	0.90	3.1	1460	1520
North Ural	Diaspo-Bementit[illegible]-Kaolinite	38.3	15.4	14.5	16.4	2.25	1.28	2.5	1440	1480
Tikhvinsk	Bementite-Kaolinite	51.1	20.2	22.5	--	1.50	0.40	2.5	1570	1635

In 1934 the estimated deposit of Tikhvinsk bauxites was 5,680,000 metric tons.
In 1934 the estimated deposit of North Ural bauxites was 10,920,000 metric tons.

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4. A technical committee, for example the one for the Engineers, had the following members:

   (a) chairman - the chief of the Army Engineers;
   (b) senior member - the chief of the engineering faculty of the Frunze Military Academy,
   (c) member - the chief of the Military Engineering Academy,
   (d) member(s) - chiefs of one or two faculties at the Engineering Academy,
   (e) temporary member(s) - a particularly well qualified engineer (usually an army officer).

   Each technical committee, in addition to its members, had a permanent staff, with a permanent secretariat. The staff was charged with summarizing for and presenting to the committee all ideas which came in on the design and development of new weapons and equipment. Ideas could come from such sources as individual members of the army, construction bureaus (Konstruktorskii Bureaux - KB) under the appropriate arms and services, and construction bureaus located in factories which manufactured military items. Each branch of the army had its establishment in or near Moscow for the development of new weapons and equipment. For example, the Engineers had such an installation near Moscow - the Military Engineers Testing Grounds (Voenno Inzhinerni Ispitatelni Polygon). This establishment had laboratories and a construction bureau. The KB was made up of officer-engineers (in this case belonging to the Army Engineers) and it was charged with developing new weapons and equipment.

5. When a Technical Committee of a certain arm or service decided that an idea for a new weapon or piece of equipment was a good one, it gave a "taktiko-tekhnichiskoye zadanie" (tactical-technical assignment) to the KB of the arm or service. The assignment indicated the desired weight and size and what the weapon should be able to do and what it should not do. Also, if complaints were received about an existing weapon - a machine gun, for example - then a "zadanie" would be given to the KB and the manufacturer, indicating that certain characteristics should be corrected or that a new machine gun should be designed. Also a "zadanie" could go out to check into the feasability of use by the Soviet Army of a weapon which had been developed by a foreign army.

6. Each Technical Committee had a list of factories capable of producing appropriate prototypes, i e factories having research and testing facilities. It also had a list of other plants able to engage in appropriate mass production.

7. After the prototype had been produced and if the specific Technical Committee approved it, the Committee recommended to the Chief of the Army General Staff that the item be introduced into the army and be mass produced. The General Staff decided upon the quantity it desired and which units should have the item and so recommended to the Council of Ministers. The latter body, along with GOSPLAN, approved or disapproved the recommendation. If approval was granted, the decision was then made as to how much should be produced and the time schedule for production. GOSPLAN had a section which knew how much material could be made available and over what period of time. In other words, this section knew which materials and how much of them were being used in all production during any year.

8. The Soviet Council of Ministers could at times exert a negative influence on military research and development, when occasionally a powerful figure (Stalin, for example) personally intervened. He did not understand the concept of a balanced force and favored tanks and artillery, not engineering equipment. The Council of Ministers was also not interested in such equipment as would be useful for the signal or transportation corps. For major combat equipment, however, the Council of Ministers tended to keep any eye on the rate of manufacture and would even help to speed it up if necessary. Generally, once a recommendation reached the Council of Ministers, it was approved, particularly if the necessary materials were available. In general, the Council of Ministers did not engage in research and development. It did not have a committee or staff division concerned with research and development of military weapons and equipment. However, at times

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individual members, such as Stalin, could and did take interest in the development of major weapons and would demand reports on the subject. Such interest, in fact, amounted to interference rather than help and served to disturb the balance of the armed forces in regard to weapons and equipment.

9. GOSPLAN did not engage in military research and development, did not have a committee for this purpose, and did not have any official connection in this regard with the Council of Ministers. GOSPLAN did assign goals to such Ministries as those of Ammunition and Machine Building, specifying which items should be produced and how many during the year. This, however, was done after the new weapons and/or equipment had been developed and approved. GOSPLAN had no authority over plans for research and development. The Ministry of Defense placed its requests for the weapons and equipment it needed before the Council of Ministers. The latter body passed on the request to GOSPLAN for the sole purpose of having GOSPLAN calculate the availability of materials and factories. Once GOSPLAN had fulfilled this function, the Council of Ministers decided upon the priorities for the use of materials for the manufacture of the military items in question.

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