



## CRM of Ukraine Database Supplements

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| Mineral target: | Vysokopilske deposit |
| Commodity:      | Bauxite              |

Version: 17 April 2024

|                                  |                                                                                                                                |
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| Project                          | 101075609 — GSEU — HORIZON-CL5-2021-D3-02                                                                                      |
| <b>Supplement Data</b>           |                                                                                                                                |
| Supplement number:               | MO.400045                                                                                                                      |
| Dissemination level:             | Public                                                                                                                         |
| Supplement type:                 | Description                                                                                                                    |
| Work package:                    | WP2: Critical Raw Materials, the International Centre of Excellence and United Nations Framework Classification (CRM-ICE-UNFC) |
| Lead WP/ Supplement beneficiary: | [EGS]                                                                                                                          |

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| <b>Supplement status</b>         |                            |
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Location: located in the Kryvyj Rig district of the Dnipropetrovsk region, 40km south of the city of Kryvyj Rig.

Exploration: explored in detail in 1950-1954, based on the results of the work, the reserves of bauxite were approved by the decision of the GKZ of the USSR dated August 20, 1952 No. 7600 in the amount, thousand tons: B - 1,838.1; C1 – 7687.9; C2 – 86.7. In 1954, work was carried out on the central part of the deposit, as a result of which the reserves were approved in the amount of A2+B+C1 – 6,130.2 thousand tons, including A2 – 1,786.8; B – 6,363.4; C1 – 1,080.0 (protocol of the USSR Central Committee, 1954). In 1958, according to the operational calculation, the State Inventory additionally recorded reserves in the amount, thousand tons: A2+B+C1 – 6,718.0, including A2 – 4,416.2; B – 1,483.0; C1 – 818.8 (protocol of the Central Committee, 1958). The total reserves of bauxite - explored in accordance with the requirements of the classification in force at that time, and those accounted for by the State Inventory - reached 18,885.0 thousand tons. Subsequently, work was carried out to study the beneficiation of bauxite and the feasibility of complex development of the deposit. In 2007, geological survey work was carried out to determine the level of readiness for industrial development in modern conditions. According to the results of the works (protocol dated 04/23/2007 No. 1265), the reserves were reassessed and tested as reserves with undetermined industrial value in the amount by categories, thousand tons: (UNFC code 331) C1 – 6,403.0; (UNFC code 332) C2 – 12,482.0.

Geological characteristics: from a geostructural point of view, the Vysokopilske deposit is located in the northeastern part of the Ukrainian Shield.

Precambrian rocks (serpentinites, schists, gneisses, granites, and migmatites), their weathered crust and sedimentary layer of Cenozoic and Quaternary rocks take part in the geological structure of the deposit area.

Aluminum ores are represented by bauxite-like rocks and bauxites, which according to the conditions of formation are divided into two groups: bauxites associated with laterite crusts of weathering of crystalline rocks and redeposited bauxites (in association with sedimentary rocks). Sedimentary bauxites have no practical value due to low quality and small thickness and reserves. Of practical importance are bauxites associated with the laterite crust of weathering of ultrabasics, amphibolites and schists, which make up the Vysokopilska greenstone structure. Bauxites are located in the upper parts of the weathered crust and are restricted to elevated areas of the relief or cover the sloping parts of depressions.

The deposit includes 11 bauxite bodies. All bodies form an almost continuous strip 21 km in length with sublatitudinal extent, at a distance of up to several kilometers from each other. The depth of the deposits is from 30 m to 110 m, on average - 70-80 m. The length of bodies - from 300 m to 3 km, width - from 300 to 800 m. The average thickness is 1.3 m, the maximum is 7.45 m. The shape of the bodies is lenticular. In the sections of the bodies, three horizons are distinguished: the upper one, 0.5-1.5 m thick, composed of brown ironstones with gibbsite; the medium has a gibbsite composition and a thickness of 1-2.5 m with the content (%): Al<sub>2</sub>O<sub>3</sub>-38.05; SiO<sub>2</sub> -8.55; Fe<sub>2</sub>O<sub>3</sub> -35.0; the lower one, with a thickness of 1-2 m, is represented by gibbsite -kaolinite-goethite rocks with an Al<sub>2</sub>O<sub>3</sub> content of -35.0%.

The main rock-forming minerals are gibbsite, kaolinite, alumogothite. Halluasite, quartz, siderite, calcite, chalcedony are present in significant quantities. In general, gibbsite-hydrogoethite, gibbsite, and gibbsite-kaolinite bauxites are distinguished by their mineral composition. The bauxites of the deposit are heavily ironized.

By chemical composition, bauxites belong to iron-alumina ores. The chemical composition of bauxite in individual deposits varies slightly: Al<sub>2</sub>O<sub>3</sub> content – from 32.2 to 49.67%; Fe<sub>2</sub>O<sub>3</sub> content - from 25.0 to 35%; content of TiO<sub>2</sub> - from 1.5 to 3%; the content of CaO and MgO does not exceed 1%; CO<sub>2</sub> content - from 0.2 to 1%; S content - from 0.1 to 0.5%; P content - from 0.03 to 0.016%. The average

content in the central, most studied part of the deposit is:  $\text{SiO}_2$  - 8.03%,  $\text{Al}_2\text{O}_3$  - 38.39%, quartz modulus - 4.78.

Bauxite deposits are overlain by sedimentary rocks - clays, marls, Paleogene sands and Quaternary sediments.

Studies of the technological properties of the bauxites of the deposit were carried out, which showed that the transfer of the Dnipro aluminum plant to the processing of bauxites from the Vysokopilske deposit requires a change in its technological scheme and a complete reconstruction, which was deemed impractical due to the relatively small reserves of the deposit.

Based on the smelting of the ore of the Vysokopilske deposit, the possibility of their use for the production of electrocorundum was proved. The possibility of obtaining ferrosilicon and self-dissolving materials has been proven alumina-containing slags, suitable for obtaining alumina by sodium leaching.

Mining technical and hydrogeological conditions are favorable for underground development.

Mineral reserves: as of 01.01.2023, bauxite reserves are listed in quantity by category, thousand tons: (UNFC code 331) C1 – 6,403.0; (UNFC code 332) C2 – 12,482.0.

The degree of development: not developed, prepared for further geological study with experimental and industrial development.