

CRM of Ukraine Database Supplements

Mineral target:	Byrzulivske deposit
Commodity:	Titanium ores

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Location. The deposit is located in the Novomyrhorod district of the Kirovograd region, stretching from the western edge of the Korobchyno village in the south-western direction for 5.5 km.

Study. The deposit was discovered by the South Ukrainian Geological Exploration Expedition in 1969-1970 as part of the general search for ilmenite placers in the Lower Cretaceous deposits within the Lebedino-Balakleivska depression. In 1971-1973, exploration and evaluation works were carried out on the area of the Byrzulivske deposit, and in 1974-1976, the preliminary exploration was conducted. Since 2000, research at the deposit has been carried out by the Production and Commercial Company "VELTA" LLC, which in 2007 received a special permit for ilmenite mining. The deposit has been developed since 2011. A detailed geological and economic assessment of the deposit was completed in 2012. According to the results of this work, the feasibility studies of permanent conditions and the reserves of ore sands and ilmenite in them by industrial categories were approved (protocol of the DKZ of Ukraine No. 2596-dsk of 11.04.2012) and tested reserves of ilmenite in the weathering crust (protocol of the DKZ of Ukraine No. 2667-dsk of 11.07.2012). In 2016, a repeated geological and economic assessment of ilmenite reserves in ore sands and weathering crust was carried out (protocol of the DKZ of Ukraine No. 3726-dsk dated November 29, 2016).

Geological characteristics. The Byrzulivske deposit is located on a sloping plateau, complicated by a rafter-beam network of the left slope of the Velyka Vys river valley. The main features of the modern topography of the area are determined by the pre-Cenozoic topography of the crystalline basement composed of the Novomyrhorodskiy massif of gabbroids of the Korsun-Novomyrhorodskiy pluton in the apical part of the Kirovograd geotectonic block. In the structure of the paleo-relief, the deposit is confined to the southwestern part of the Lebedino-Balakleivska depression. The geological structure of the deposit includes: crystalline rocks anorthosite, gabbro-anorthosite, rapaki granite and their weathered crust, sandy-clay sediments of the Lower Cretaceous, Paleogene, Neogene age, and Quaternary sediments. Rocks of the weathering crust have an increased content of ilmenite from 20 to 100 kg/m³, but the technological scheme of beneficiation of such ores of the Byrzulivske deposit is currently unprofitable. Industrial concentrations of ilmenite are limited to continental (Smilyanski layers) and coastal-sea (Albian layer) sands of the Lower Cretaceous, as well as overlying Paleogene sediments. Productive placer is a layer-like body, confined to the relief decrease of crystalline rocks and their weathering crust. The content of ilmenite in the wells varies from 45 to 510 kg/m³, the average is 160 kg/m³. The average thickness of the ore sand body is 7 m, the average depth of its occurrence is 35 m. Ore-free areas on the area of the productive deposit are very rare and small in size (40-80m). The Lower Cretaceous ilmenite-bearing sediments of the deposit are overlain by Paleogene, Neogene, and Quaternary rocks. The Eocene sediments are represented by multi-grained sands up to three meters thick with an increased ilmenite content of 50 kg/m³. Fine and fine-grained sands of the Kharkivska Suite with a thickness of up to 20 m are spread everywhere. In the lower part of the layer (1-2 m) there are clayey sands with an increased content of ilmenite up to 50 kg/m³. In the southeastern part of the field, quartz sands of the Poltavska Series with a thickness of 2-12 m are exposed. Neogene variegated clays, unsegmented Neogene-Quaternary red-brown clays with a thickness of up to 5 m are developed sporadically in separate areas in the form of small lenses and layers. Quaternary eolian-deluvial loams with a thickness of 2-30 m are developed everywhere on the area of the deposit. The thickness of overburden rocks varies from 22 to 42 m. The ilmenite-bearing deposit of the weathering crust lies in the depth interval of 24-52 m, its average thickness is 10.25 m. Loose overburden rocks lie above, and ilmenite-bearing sands lie directly above the weathering crusts. Intermediate overburden between ore-bearing sands and weathering crusts has not been established. The hydrogeological conditions of the deposit area are characterized by the development in the geological environment of the Byrzulivske deposit of three aquifers in Neogene, Paleogene and Cretaceous sediments. These aquifer complexes do not have aquifers between them and therefore are considered as a single aquifer and complex, which is limited in the hanging-wall by Quaternary clay sediments, in the footwall - primary kaolins of the

weathering crust of crystalline rocks. The main source of water inflows to the quarry is the underground waters of the Lower Cretaceous aquifer. The mining and technical conditions of working out the deposit are quite difficult due to the presence of a large amount of overburden. The thickness of the productive horizon of ilmenite-bearing sands is 1.8-20 m. Ore sands are underlain by a weathering crust with a thickness of 1 to 28 meters.

Assessment of resources/ stocks . Information about mineral reserves is confidential.