

CRM of Ukraine Database Supplements

Mineral target:	Burtynske deposit
Commodity:	Graphite

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Supplement status	
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Location: located in the Shepetivskiy district of the Khmelnytskyi region at a distance of 1 km to the north-east from the Gorodnyavka village and 0.7 km on the NW from the Maidan Vila railway station.

Degree of study: In 1993-1995, reconnaissance work was carried out on the Gorodnyavska site to prepare it for industrial development. The deposit is explored by inclined core drilling wells to a depth 150 m from the surface. Reserves of category B, which are located in the central part of the field, were studied on a grid of about 100×25-50 m reserves of category C₁, which directly border on reserves of category B, were studied on a grid of 200-300×25-50 m. The total number of prospecting and exploration wells drilled in the Horodnyavsk part of the field is 172, the drilling volume was 20,759.2 meters. The calculation of reserves of all categories includes data from 136 wells, and the number of chemical analyzes for graphite carbon is 5,464. Reserves were calculated by the method of geological sections.

The Gorodniavska site is the northwestern part of the Burtynske deposit, which is a graphite-bearing metamorphogenic layer that forms an isoclinal fold with a northeast dip at an angle of 40-80°. It stretches from the southeast (the Burtyn village) to the northwest (Gorodnyavka village) for a distance 1.8 km being of 0.3- 1.3 km wide. The square of the site is 0.8 km².

The mineral deposit is confined to the northeastern limb of the large Shepetivska anticline of the Volyn block of the Ukrainian Shield. The main graphite-bearing rocks are graphite-biotite gneisses and their migmatites.

Sedimentary formations lie on the entire area as a continuous cover. They are represented by Quaternary eluvial-deluvial sands, sandy loams, loams and Neogene variegated clays. The thickness of sediments varies from 1.5 to 30.6 m, making on average 13.5 m.

The crystalline rocks and ores of the deposit are represented mainly by biotite, graphite-biotite gneisses, biotite and graphite-biotite migmatites, granites, pegmatites and their weathering crusts.

The width of the ore body in plan is 400-450 m on the flanks and 500-450 m in the central part of the site. The structure of the ore deposit is complicated by bodies of granites and gneiss-migmatites of varying strength from 3.0 to 15.0 m. Their dipping patterns coincide with ores. The volume of barren bodies within the ore deposit is 12%.

All crystalline rocks, including ores, are visually divided into three zones:

- zone of complete kaolinization (loose ores);
- the zone of partial kaolinization, disintegration and increased cracking (semi-loose ores);
- dense rocks and ores.

Kaolin weathering crust of graphite-biotite gneisses (loose ore) lies under variegated clays. It is developed over almost the entire area of the deposit. Its power varies from 1.5 to 30 m and is on average 10 m. Rocks and ores in the zone of complete kaolinization are primary (structural) kaolins, which are characterized as viscous, weakly plastic formations. The average graphite content is 6.05-6.55%, ore mass weight – 2.27 t/m³.

Under the weathering kaolin crust, a zone of disintegration and partial kaolinization is developed, which is represented by highly fractured rocks and ores that are semi-fluid and gradually turn into dense rocks and ores. The thickness of the disintegration zone is 10-75 m, making on average 50 m. The average graphite content is 6.04-6.52%, ore mass weight – 2.27 t/m³.

Dense ores and host rocks lie below the disintegration zone. Ores are represented by gneisses and migmatites of graphite-biotite composition, undisturbed by weathering. The average graphite content is 5.5-5.89 t/m³, ore mass weight is 2.58 t/m³.

For beneficiation of graphite ores in the Gorodniavska area, a technological scheme is recommended, which includes two stages of crushing and six flotation cycles with the return of the industrial product to the main flotation operation.

Crushed or disintegrated ore is sent to the main flotation to obtain a crude concentrate; tailings of the main flotation - for control flotation with the production of mining concentrate. The enrichment of

the raw concentrate includes two stages of grinding and six census flotations with the return of industrial products to the main flotation operation.

The hydrogeological conditions at the deposit are simple. The mining and geological conditions of the deposit are favorable for its open mining. The angles of quarry walls are taken as equal to 30-35°.

Reserves of graphite ores of the Gorodnyavska section of the Burtynske deposit approved by the decision of the DKZ of Ukraine dated 12.20.2004 No. 915 in the amount by categories:

Reserve category	Mass of dry ore, thousand tons	Average graphite carbon content in ore, %	Graphite carbon reserves, thousand tons
B+C ₁ +C ₂	129976.6	5.76	7483.6

According to the industrial value, the degree of technical, economic and geological study, the balance reserves of graphite carbon of categories B and C₁ are assigned to the class under the code (111), and those of category C₂ - to the class under the code (122); off-balance reserves of graphite carbon of categories B and C₁ are assigned to the class under the code (221), and categories C₂ - to class (222).

Off-balance reserves of graphite carbon in the amount:

Reserve category	Mass of dry ore, thousand tons	Average graphite carbon content in the ore, %	Graphite carbon reserves, thousand tons
B	299.7	2.07	6.2
C ₁	5806.9	2.77	160.7
B+C ₁	6106.6	2.73	166.9
C ₂	3266.0	3.33	108.8
B+C ₁ +C ₂	9372.6	2.94	275.7

At the deposit, reserves and prospective resources are estimated below the horizon + 90 m to the depth of the altitude -5.0 m, without expanding the quarry.

Reserves and prospective ore resources are: category C₂ – 31,093.9 thousand tons, P₁ – 25,366.9 thousand tons. As of January 1, 2023, reserves at the deposit remained unchanged. The field is being developed by SPIS UKRAINE LLC.