



CRM of Ukraine Database Supplements

Mineral target:	Biganske deposit
Commodity:	Baryte

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Mineral: main - polymetals, barite, secondary - gold, silver.

Location: located in Beregivsky District, Transcarpathian Region. The deposit area has a well-developed network of highways and railways.

Degree of study: in 1960-1967, geological prospecting and reconnaissance work was carried out, as a result of which reserves of baryte-polymetallic ores were approved in the following categories: B+C1+C2 – 2314.3 thousand tons with BaSO₄ content – 35.7-41.9%; off-balance - 1,610.5 thousand tons with BaSO₄ content - 35.7 - 41.9%; in addition, in the number of approved reserves of barite ores, reserves of silver, zinc and lead under category C2 are calculated in the amount, balance: silver - 135.8 tons; zinc – 9.2 thousand tons ; lead - 2.4 thousand tons; off-balance sheet: silver – 79.4 tons; zinc – 22.3 thousand tons ; of lead - 5.9 thousand tons (protocol of the State Committee of the USSR No. 4342 of June 24, 1964). In 2007, prospecting and evaluation works were carried out within the boundaries of the Biganske deposit.

Geological characteristics: The Biganske ore field, a component of which is the deposit of the same name, is part of the Inner Carpathian volcanic belt and has an area of about 30 km², the deposit is located in the eastern part of the ore field on an area of 7.5 km².

The stratified formations of the ore field belong to two structural layers: the lower Alpine folded complex, or the basement (Upper Cretaceous-Paleogene); the upper cover complex, which includes Miocene-Pliocene sedimentary -volcanogenic, Pliocene volcanic and limnic terrigenous Quaternary continental molasse formations.

The folded complex of the ore field is composed of phyllitized argillites, siltstones, sandstones with interlayers of diabases and limestones.

Sedimentary -volcanogenic and volcanogenic formations are represented by tuffs with a thickness of 70-100 m, siltstones, argillites with a thickness of 0-200 m, rhyolitic tuffs ("intermediate tuffs" pile) with a thickness of 700 m. The pile of "intermediate tuffs" is an ore-bearing horizon for polymetallic and gold-polymetallic ores in the middle and lower horizons of the Biganske baryte-polymetallic deposit.

Quaternary sediments overlap older rocks and are represented by continental formations, among which deluvial, deluvial-colluvial, eluvial, alluvial, lacustrine deposits are distinguished.

Magmatic formations of various compositions take part in the structure of the Biganske ore field. According to the depth of formation and genetic features, they all belong to the shallow group subvolcanic formations, which are represented by stocks, laccoliths, necks (valves), dykes from felsic to intermediate composition, as well as more mafic - mainly, dykes and sill-like bodies.

Disjunctive forms play a significant role in the structure of the ore field. Among the faults, the northwest and northeast or submeridional faults are the most developed.

The largest ore zone of the deposit is the Mayska ore zone, which is located in the normal fault of the same name.

The ore zone, as a rule, consists of one ore body that is relatively weathered by dip and extension, which is accompanied by numerous subparallel lenses and short veins that create stock-like ore bodies.

The Mayska ore body is a zone of crushed, sometimes secondary silicified rocks with inclusions, nests and lenticular vein bodies composed of ore and vein minerals.

The average thickness of the ore body in its barite part is 5- 8 m, and in the polymetallic part - 10-12 m.

On the southern flank of the deposit, during the study of the "golden block", the Mayska zone is revealed on the horizon -560 m in 750 m from the surface by the dip of the ore body.

According to the mineral and chemical composition, ores of the Biganske deposit are divided into barite, mixed (barite-polymetallic and polymetal-barite) and polymetallic . The content of barium sulfate in ores varies in a wide range - from 11 to 86%. The average content of barite in the balance ores of the Mayska ore zone is 33.52%.

Quartz and other forms of silica (opal, chalcedony, etc.) are contained in barite ores from 10-14 to 80% - on average, about 20%. In barite ores, iron oxides and hydroxides are always present in the amount of 2-3%, decreasing to 1% and increasing to 8%. Other minerals are present in the ore sporadically and in small quantities.

As an isomorphic impurity, barite can contain strontium in amounts up to tenths of a percent. As a matter of fact, no strontium minerals have been found at the Biganske deposit.

Silver is present as a useful component in barite ores. Its content is from the first to hundreds of grams per ton of ore, more often 10-60 g/t. The average silver content in the balance barite ores of the Maiska ore zone is 32.2 g/t. According to such average data, the barite ores of the Biganske deposit belong to the medium grade in terms of the main useful component.

The content of ore minerals in barite ores is small and they are presented (in descending order): hematite, pyrite, ilmenite, magnetite, galena, chalcopryrite, argentite, pyrrargyrite, native silver. In isolated cases, cinnabar is found in barite ores.

In gold-polymetallic and proper gold ores, the main typomorphic minerals are: chalcopryrite, pyrite, hematite, amethyst-like quartz, adular and native gold.

In the upper horizons, in lead-zinc ores proper, gold accumulates along the mineralization axis, forming separate clusters of gold-polymetallic ores among polymetallic ones. The gold content in such cases is 2-5 g/t.

The mixed ores include ores of barite-polymetallic or polymetallic-barite composition, the division of which into subtypes is impossible due to the fact that it is impossible to geometrize them in separate blocks with a separate calculation of reserves. This type of ore is transitional from barite to polymetallic.

In connection with such a feature - a transitional position - the content of useful components varies within very wide limits: for barium sulfate from 3-5 to 35% with an average value of 26.42%, for zinc from 0.8 to 12.5% (average content – 1.46%); for lead - from 0.2 to 0.9% with an average of 0.43%; silver - from 10 g to kilograms per ton of ore (average content 73.0 g/t). The ores contain: gold, copper and cadmium in small amounts. The latter is related to sphalerite and can be extracted from zinc concentrate. Gold can also be extracted from lead and zinc concentrate.

Polymetallic ores are composed of galena, sphalerite and pyrite. The veined and interspersed form of ore bodies is more common, less often the central part of the vein bodies is composed of massive sulfide ores. As a rule, the zinc content exceeds the lead content in a ratio of 1:2.0-3.5.

Gold in polymetallic ores is very unevenly developed. It is almost absent in the central part. In the north of the deposit, at depths of 50-150 m, gold with an industrial grade (2-5 g/t) was discovered in individual wells. In the southern part, in the deep horizons (minus 300-650 m) of the deposit, the gold content in ores increases significantly and it plays a major role in the composition of polymetallic ores. According to the composition of useful components, such ores become gold with polymetals.

The content of silver in polymetallic ores in comparison with mixed ores is significantly reduced to the first tens of grams per ton of ore, cadmium is also noted, the content of which in ores is 0.012-0.015%.

Mineral reserves: the balance reserves of polymetallic ores of the Mayska ore zone have the following contents of useful components: zinc – 3.07%, lead – 1.41%, gold – 1.4 g/t and silver – 25.2 g/t. Laboratory technological studies proved the possibility of obtaining from baryte-polymetallic ores of the Biganske deposit by the method of beneficiation according to the gravity (reagent-free) scheme of a collective baryte-polymetallic concentrate for further processing into selective barite, lead, zinc and pyrite concentrates.

Both actual barite ores in the amount of 2.9 million tons and mixed barite-polymetallic ores in the amount of 4096.9 thousand tons can be used for the production of barite concentrate. The total reserves of useful components in mixed and polymetallic ores, from which it is possible to obtain metals as a result of metallurgical processing, amounted to: zinc - 390.8 thousand tons; lead — 129.5 thousand

tons; copper - 10 thousand tons; gold - 9891.5 kg; silver - 506.1 tons.; cadmium - 2125 tons and sulfur - 1596.4 thousand tons.

According to the results of the works in 2002, the reserves of balance ores were calculated (protocol of the R&T of the State Enterprise "Zahidukrgeology" No. 1043 dated 05/20/2004):

- barite by categories B+C1+C2 – 2,880.2 thousand tons (barium sulfate content 34.02%); of mixed barite-polymetallic by C1 +C2 categories – 4096.9 thousand tons (barium sulfate content 15.33%, zinc – 2.00%, lead – 0.57%, silver – 61.0 g/t, conventional zinc - 5.65%);
- polymetallic - 11,808.6 thousand tons (zinc content - 2.62%, lead - 0.90%, gold - 0.8 g/t and silver - 21.7 g/t, conditional zinc - 4.81%) . Metals were calculated in mixed and polymetallic ores: zinc – 390.8 thousand tons, lead – 129.5 thousand tons, copper – 10 thousand tons , silver – 506.1 thousand tons, sulfur – 1596.4 thousand tons , as well as gold and cadmium, information on the amount of reserves of which has limited access.

In the deep horizons and flanks of the Mayska ore zone and in the expected ore bodies, promising resources of categories P1 and P2 of barite ores in the amount of 944 thousand tons (barium sulfate content 31.40%) and polymetallic ores in the amount of 10,103.9 thousand tons were calculated that contain: zinc – 303.0 thousand tons, lead – 109.4 thousand tons, gold – 10,521 kg and silver – 176.4 tons.

On the basis of the previously compiled TED with the involvement of materials from the development projects of the Biganske barite and Muzhiivske gold-polymetallic deposits, technical and economic considerations (TEM) were developed in new prices, the calculations of which show that the development of the Biganske barite-polymetallic deposit is expedient and can be economically effective, and therefore needs further study.

The central, pre-explored part of the Biganske deposit, on which reserves of lead, zinc, gold, silver and cadmium have been calculated, is prepared for detailed exploration. For its implementation, the penetration of underground mine workings and mine shafts in a complex with wells is required. It is clear that the implementation of such a project, in turn, requires significant allocations. As of January 1, 2023, the deposit is not being developed.