



CRM of Ukraine Database Supplements

Mineral target:	Pokrovo-Kyreivske deposit
Commodity:	Fluorite

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Location: Donetsk region, Starobeshivskiy district, 10 km southeast of the Kolosky passenger railway platform of the Donetsk Railway, 25 km southwest of Kuteynikove station.

Exploration: The deposit was discovered in 1958. In 1958-1962 by the Priazovska Complex Geological Exploration Expedition of the "Artemgeology" Trust. The deposit was explored with core drilling wells on a grid of 50×50, 50×25, and 25×25 m. The reserves of fluorite ores were approved by the protocol of the State Committee of the USSR No. 3930 dated 26.02.1963. According to the results of the work in 1965, the hard conditions for the development of the deposit were revealed.

Geological characteristics: Pokrovo-Kyreivske deposit of fluorite ores is located in the junction zone of the Folded Donbas and the Azov megablock, in the Volnovaska zone, associated with the intersection of sublatitudinal and submeridional deep tectonic zones.

Precambrian rocks (Archaean - Proterozoic), Paleozoic, Mesozoic and Cenozoic sediments take part in the geological structure of the deposit. Archaean rocks are represented by gneisses and amphibolites, which lie among migmatites in the form of bands and xenoliths. Proterozoic sediments are represented by granites, migmatites and gabbro-granosyenite complex.

Paleozoic sediments are developed along the junction zone of Donbas with the Azov region, represented by sedimentary Devonian and Carboniferous rocks and a complex of volcanic formations - basalts, andesites, orthophyres, pyroxenites, malinijites, keratophyrites, some of which belong to the Lower Mesozoic.

The Mesozoic is represented by Upper Jurassic - Lower Cretaceous and Upper Cretaceous sediments. The Cenozoic is represented by sediments of the Tertiary and Quaternary systems.

The deposit consists of rocks of two structural and geological levels:

the upper one (Meso-Cenozoic) with an average thickness of 100 m, is composed of loose sandy-clay sediments;

the lower (Paleozoic) level, in which the fluorite ore body is located, composed of relatively strong, but fractured rocks - limestones, orthophyres, andesites.

Genetically, the deposit is associated with alkaline formations of the molysite type.

Fluorite ores lie at a depth of 100-120 m.

Three ore bodies were discovered at the deposit - Central (or Main, where about 95% of all reserves are concentrated), Northern and Southern, as well as several small ore bodies (classified as off-balance).

The central ore body is about 250 m long, the width varies from 70 to 180 m, the depth of the upper limit is 80-120 m (on average 100 m), the lower limit is 150-180 m (on average 160 m). This body is a thick unit of metasomatic type, of a rather complex shape, with a dip to the west at an angle of 25-30°. The thickness of the body varies from 4.4 to 70 m (40 m on average). The Northern and Southern ore bodies are characterized by approximately the same elements of occurrence, but their thickness is 25 m and 1 m, respectively.

The ore bodies are confined to the Lower Carboniferous Tournesian limestones, partly to keratophyrites of post-Lower Carboniferous age, lying in limestones in the form of dykes. Accordingly, two mineralogical types of ores are distinguished: carbonate-fluorite, which arose due to melting of limestone; carbonate-feldspar-fluorite, which arose due to melting of keratophyrites and cementation of their fragments with fluorite. In places where the ores reach the pre-Mesozoic surface, they are prone to weathering, leaching, and are partially redeposited (sometimes represented by fluorite sand, loose sandstone on clay cement), which gives reason to call these ores deluvial-proluvial.

The main ore body is bounded by faults in the west and south, and in the east it outcrops on the pre-Mesozoic surface or is pinched out. There are practically no ore-free non-economic layers in the ore body. Zoning is noted in the structure of the ore body: deluvial-proluvial ores (chemical) are located on top; the middle part is occupied by carbonate-fluorite (rich or metallurgical) ores; in the lower part of

the ore body there are carbonate-feldspar-fluorite (ordinary, or those that require enrichment) ores and they prevail in the southern part.

Chemical composition: CaF_2 - 61.92% ; CaCO_3 - 15.14% ; SiO_2 - 6.35% ; S - 0.119% ; P_2O_5 - 0.054%.

Varieties of fluorite ores:

- a) high-grade (F-75): CaF_2 - 80%; CaCO_3 - 7.79%; SiO_2 - 2.4%; S - 0.1%; P_2O_5 - 0.05%;
- b) ordinary: CaF_2 - 50.5% ; CaCO_3 - 21.54% ; SiO_2 - 8.9% ; S - 0.14% ; P_2O_5 - 0.057%;
- c) chemical: CaF_2 - 85% ; CaCO_3 - 1.52% ; SiO_2 - 3.25% ; S - 0.03% ; P_2O_5 - 0.046%.

The main ore body is cut by faults, which are clearly visible in its western part. According to the complexity of the geological structure, the deposit belongs to the second group.

The hydrogeological conditions for the development of the deposit are complex, determined by the presence of aquifers in Neogene, Cretaceous and Carboniferous sediments, as well as complex tectonic conditions. The estimated inflow of water that will be installed in the pit with the full development of mining operations will be 1,100-1,200 m³/hour, in the mine - up to 800 m³/hour.

Groundwater is characterized by relatively low mineralization. There is a demand for high-quality drinking water and technical water for industry in the district, so their development is possible. About 50% of water can be used for drinking purposes, the rest for technical purposes.

The mining and technical conditions for the development of the deposit are complicated due to the presence of a thick layer of Neogene sands characterized by floating properties, very saturated aquifers, as well as weakly resistant tuffogenic clays, which may collapse when the deposit is mined, which will complicate the working conditions and additional water flow. The open-cast mining method has great advantages, as it is less dangerous, in which the separate mining of ores can be carried out by grades, as well as the mining of other minerals - limestone, sand, clay, nepheline syenites. But the disadvantage is relatively small reserves of ores in relation to the large-scale extraction of overburden.

Estimate of resources/reserves: as of 01.01.2023, reserves of carbonate-fluorite ore are estimated by categories, thousand t: C1 - 1,927.0 including fluorspar (fluorite) - 1,231.0; C2 - 300.0 including fluorspar (fluorite) - 167.0; off-balance reserves - 161.0 including fluorspar (fluorite) - 35.0.