

CRM of Ukraine Database Supplements

Mineral target:	Dobra deposit
Commodity:	Lithium, niobium, tantalum, beryllium

Version: 17 April 2024

Project	101075609 — GSEU — HORIZON-CL5-2021-D3-02
Supplement Data	
Supplement number:	MO.400010
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]

Supplement status	
Endorsed (WP leader):	Guillaume Bertrand, BRGM
Supervised	Boris Malyuk, BRGM/GIU
Approved (Metadata Coordinator):	Oleksiy Likhosherstov, GIU
Author(s):	Affiliation:
Nataliya Kovalenko	GIU
Stella Shekhunova	IGS
Vitaliy Sukach	IGMOF
Maria Kurylo	UAG

The area of Dobra deposit comprises lithium ores and ore deposits of the Lipnyazhskiy granite dome; the minerals include lithium ores, associated minerals are tantalum ores, niobium ores, rubidium ores, beryllium ores, tin ores and cesium-containing ores, tungsten ores, gold ores.

Location: Novoukrainskiy district of Kirovograd region, from the eastern outskirts of the Novostankuvata village to the northern outskirts of the Ternove village in the southern direction.

Exploration: The Stankuvatskiy, Nadiya, Novostankuvatskiy, Tashlytskiy, Lutkivskiy and Kontaktoviy ore occurrences were discovered by expedition No. 47 of KP "Kirovgeology" in 1989 during geological and forecasting works on a scale of 1:50,000 for gold and rare metals, and then in 1991-2001, when prospecting for lithium and gold deposits on a scale of 1:25,000-1:10,000. In 2017, by the decision of the DKZ of Ukraine (protocol dated November 1, 2017, No. 4142), the Nadiya and Stankuvatske ore occurrences were merged in one ore zone - the Dobra site.

Site square: 1706.9 ha

Geological characteristics In terms of geotectonics, the Dobra site is located within the Bratskiy Synclinorium of the western part of the Ingul Megablock of the Ukrainian Shield. It is confined to the Mykhailivska zone of tectonic-metasomatic activation, which is one of the tectonic elements of the thick Zvenigorod-Gannivska fault zone in the southwestern and western border of the Novoukrainskiy and Korsun-Novomyrhorodskiy granitoid plutons. From a metallogenic point of view, the Dobra site is included in the area of the Stankuvatske ore field of the Central Ukrainian (Shpolyansko-Tashlytskiy) rare metal region, which is characterized by fields of swarms of rare metal pegmatites with industrial concentrations of lithium, tantalum, rubidium, cesium, and close to industrial concentrations of beryllium, niobium, and tin. Directly, the area of development of spodumene-petalite pegmatites of the Dobra site is located in the southwestern outer (exocontact) zone of the Lipnyazkiy granite dome, the core of which consists of early Proterozoic granites of the Kirovograd complex, and numerous ore-bearing pegmatites of the rim are tentatively classified as its derivatives. The rocks bordering the granite dome are represented by migmatites, gneisses and amphibolites and extend in the northwest direction for a distance of about 5000 m. The oreogenesis in the area has a single evolutionary series of alkaline metasomatism: potassium-sodium pegmatites are replaced by sodium-lithium spodumene pegmatites, which further pass into sodium-lithium petalite pegmatites. The process ends with acid leaching with the formation of muscovite and sillimanite paragenesis. Superimposed metasomatic processes – albitization, silicification, greisenization, and others lead to obscuring the features of the primary zonal structure of pegmatite veins. Rare metal pegmatites are accompanied by high alumina (cordierite) metasomatites and muscovite greisens. The final stage of oreogenesis is graphite mineralization in the form of seams in tectonically weakened zones. These graphitized and silicified mylonite seams are associated with superimposed sulfide mineralization: loellingite, arsenopyrite, pyrite, nickeline, molybdenite, sphalerite, bismuth, and native gold. The fact of structural compatibility of rare metal bodies with anomalies of chalcophiles and gold increases the prospects of the Dobra site as a complex ore target.

The presence of two lithium minerals (petalite and spodumene) in the ores makes it possible to selectively obtain spodumene and petalite concentrate. The basement rocks are overlain by loose terrigenous sediments of the Meso-Cenozoic platform cover and a weathering crust with a total thickness of 80-120 m. The area consists of two separate zones of closely located veins of ore-bearing pegmatites that were outlined in the process of exploration and evaluation - Stankuvatska and Nadiya.

The Stankuvatska zone is traced for a distance of 2 km by six profiles of deep wells on a grid of 200-350×100-200 m in the northern part, and 600-650×100-260 m in the south and in the center. The ore bodies form a series (from 8 to 12) of albite-spodumene-petalite dykes steeply dipping to the west (65-75°), albite-spodumene pegmatites of various shapes with swellings, reductions, and branches, which are conventionally grouped into 3 ore zones. The true thickness of bodies is from tens of centimeters to

the first tens of meters (25-30 m). The ore bodies are not contoured as they fall, but are traced to a depth of 500 m. The thickest bodies are confined to the core parts of the pegmatite series. Pegmatites with industrial lithium mineralization occur only among amphibolites, without going beyond their limits in the sequence of the host gneisses. Pegmatites of the sodium-lithium series are replaced along the course by microcline-albite, in which columbite-tantalite mineralization with struverite, beryl, chrysoberyl in association with uraninite, cassiterite, and ilmenite is found in the areas of albitization. In sodium-lithium pegmatites and lithium metasomatites, the main ore minerals are represented by spodumene (22%), petalite (10%), lithiophyllite-triphylline (1.5%), amblygonite and chrysoberyl. Among the accessory minerals, cassiterite, ferrocolumbite, ilmenorutyl and others were found. According to the predominant lithium mineral, the following types of ores are distinguished: petalite - 32% of the total amount, spodumene - 28%, spodumene-petalite - 17% and petalite-spodumene - 23%. The content of lithium oxide in the ore varies from 0.345 to 2.23% (average – 1.30%). The content of accompanying elements: Rb_2O_3 -0.036% (maximum - 0.092%), Ta_2O_5 -0.004%, Be-0.01%, SnO_2 -0.01%.

The Nadiya zone - traced over a length of 2.1 km by 4 profiles of deep wells drilled on a grid of 680-800x130-200 m in the north and 310-370x100-250 m in the south, has a similar geological and structural position to Stankuvatska zone. The ore bodies are represented by a series (from 25 to 40) of ore-bearing microcline-albitic pegmatites with an average thickness of up to 30-32 m located close to the veins, individual bodies of which are traced along the extension for 800 m, but are not contoured along the dip. The width of the zone with ore bodies is 340-390 m, the total length is 1600 m. The highest concentrations of lithium are observed in the pegmatite bodies of the central part of the zone. In general, the composition of the ores does not differ from the ores of the Stankuvatska zone. According to the mineral composition, microcline-petalite-spodumene-albite and microcline-spodumene-albite varieties are distinguished. The ores are composed mainly of late (secondary) generation petalite and spodumene. Spodumene type of ores prevails. The average content of the zone: lithium oxides – 1.31%, rubidium – 0.09%, cesium – 0.007%, tantalum pentoxide – 0.004%, niobium – 0.007%.

Groundwater within the territory of the deposit is confined to a complex of Precambrian crystalline rocks (fracture waters) and to loose rocks of Cenozoic sediments (stratified waters), lying in a blanket-like manner on the weathered crust, and where it is eroded - directly on crystalline rocks. According to the chemical composition, fracture waters are mainly hydrocarbonate and chloride-hydrocarbonate, magnesium-calcium with mineralization from 0.5 to 2.0 g/l, pH - 7.0-7.5. Groundwater of loose sediments is characterized by a similar composition, however, the presence of nitrate ion (from several mg/l to 1 g/l) was detected in most samples from this aquifer.

The mining and geological conditions of operation are characterized by a steep dip and depth of ore deposits. The significant thickness of overburden (up to 80 m) dictates the choice of an underground method of deposit development.

According to the complexity of the geological structure, the Dobra ore object is classified as deposits of group 2 (complex structure) in accordance with the Classification of Mineral Reserves and Resources of the State Mineral Resources Fund. The mining and geological conditions of the occurrence of ore deposits provide for an underground method of development. The Dobra site is to be a large industrial facility with a complex type of ores.

As of January 1, 2023, the Dobra site is not being developed.

Estimation of resources/inventories. Information on the mineral reserves and resources is confidential.