



CRM of Ukraine Database Supplements

Mineral target:	Zhovtorichenske deposit
Commodity:	Vanadium, scandium

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Location: The deposit is located within the city of Zhovti Vody and is connected by railway and highways to the Pyatykhatky railway station (18km), the cities of Kryvyj Rig (69km), Dnipropetrovsk (132km).

Exploration: The deposit has been developed since the end of the 19th century. Until the mid-1940s, only rich iron ores were mined. Reserves were approved by the decision of the Central Committee of the USSR in 1956, protocol No. 1274. Since 1946 along with iron, uranium ores were mined. By the end of 1989 balance reserves of uranium ores have been exhausted, mining has been stopped. Complex rare metal mineralization was discovered along the way in the 1970s, in 1980-1985, the previous one was held, and in 1986-1992 detailed intelligence. In 1993 by the decision of the DKZ of Ukraine (protocol No. 111 dated 29.07.1993), in addition to reserves of scandium dioxide and uranium, reserves of vanadium pentoxide were also approved in ores. In addition, resources of ore and vanadium pentoxide were estimated.

The reserves of the deposit have been recorded by the State Inventory since 1996. In the period 1993-1995 exploratory and industrial extraction of vanadium-scandium ores was carried out at the deposit.

In 2012, at the Zhovtorichenske deposit (western layer) a geological and economic reassessment was conducted, according to the results of which the reserves of magnetite ferruginous quartzites were approved by the decision of the DKZ of Ukraine (protocol No. 2863 dated March 20, 2013; No. 3028 dated November 6, 2013).

The deposit is not developed.

Deposit area: 3.5 km²

Geological structure: Zhovtorichenske complex deposit of uranium-vanadium-scandium ores is located in the central part of the Ukrainian Shield, in the northern part of the Kryvorizkiy iron ore basin, in the area of distribution of Precambrian metamorphic rocks of the Kryvorizka Series, arranged in a synclinal fold. The Zhovtorichenska syncline is an ore-bearing structure of iron, uranium and scandium ores.

Industrial scandium mineralization is confined to the western flank of the synclinal fold. The ore-bearing rocks are diopside and tremolite quartzites, actinolite schists, which were intensively metasomatized, especially at the contacts with dolomites. The most common form of mineralization is steeply dipping plate-like bodies and lenses with a thickness of several meters to 30-35 m. Converged ore bodies and lenses form a productive zone with a capacity of up to 85 m. Useful components do not form their own mineral forms, but are found as isomorphic impurities in rock-forming minerals of hydrothermal metasomatites. Scandium, vanadium and partially zircon are concentrated in minerals - aegyrine-acmite and some alkaline amphiboles. The remaining components (rare earth elements, yttrium, uranium) are found as micro impurities of their own minerals in apatite grains. According to their content of scandium, uranium and rare earth elements, ores are divided into two varieties: uranium-vanadium-scandium and uranium-scandium-rare earth.

Mining, geological and hydrogeological conditions of the deposit are favorable. The deposit is exposed from the surface by vertical mine shafts. The bodies of scandium ores are located within the central part of the depression funnel and their development will take place in practically drained rocks.

Estimate of resources/reserves: residual reserves recorded by the State Inventory of Mineral Reserves and as of 01.01.2023 are made up by categories (UNFC codes):

1. Iron ores, thousand tons:

- The main layer (rich iron ores, ferruginous, magnetite quartzites): B+C1 – 39,415, C2 – 9,770;
- Western layer (iron quartzite, magnetite): UNFC code 111/B+C1 – 90,787; UNFC code 121/ C2 – 523,409, UNFC code 332/undefined industrial value – 86,402.

2. Information about mineral resources and reserves of other minerals is confidential.