A METHOD OF MINING ORE BODIES IN THE CRYOLITIC ZONE INVOLVING ICE-ROCK BACKFILLING

Description

The method is based on the following. Ore body opening (Fig. 1a) is performed using a spiral ramp made in hosting rocks, and an air-access rise equipped with a chamber for feeding crushed rock for backfilling and located in the opposite deposit edge with respect to the ramp.

Ore is mined (Fig. 1b) by layers upwards and starts with making a layer splitting drift in the bottom part. The production layer is mined using cuts made from the splitting drift in two directions and dipping at 10÷12° towards deposit flanks to make backfilling easier. The cuts are mucked by turns. Mucked ore is hauled to the ore chute. Backfilling material is hauled by LHD from the waste pass. Backfilling of mined-out cuts is made by layers 0.4÷0.6 m thick that are sprayed with water and frozen. Once the primary cuts are frozen, the secondary ones are taken out that can be backfilled with waste rocks without water saturation (dry stowing).

Sketch of ore body opening.

The second and next layers are also opened from the spiral ramp using layer splitting drifts, and ore mining and backfilling works are carried out as shown above.

Technical appraisal and economic benefits

The main advantages of the described mining system includes: high recovery (0÷3 % of losses), a low ore dilution associated with efficient supporting of the mined-out space not requiring construction of stowing systems and use of expensive materials (cement, steel materials etc.), and a lower environmental impact due to decrease of waste dumping areas.
**Application areas**

Underground mining of deposits in the cryolitic zone represented by small deposits of rich ores of lens-, pipe- and rod-like shapes located in the permafrost zone, provided that ores and hosting rocks are strong enough to ensure stability of stopes during stoping and backfilling.

**Development stage**

The method is submitted in the form of recommendations for mining a blind ore body in Aikhal kimberlite pipe deposit.

**Patent situation**

Patent pending.

**Commercial offers**

Investment agreement for method commercializing (organization of production).

**Estimated cost**

As agreed price.

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