Meeting Paper

Geotechnological Method for Kimberlite Mining

A. Kublanov, E. Valuev, M. Fomkin, E. Karatygin

Solution Mining Laboratory of
Research and Development Institute of Galurgy,
Saint Petersburg, Russia

**Kublanov A.V., Valuev E.P.,
Fomkin M.P., Karatygin E.P.**

Geotechnological Method for Kimberlite Mining

Introduction

Arkhangelsk deposit of kimberlites found in five pipes is a unique deposit of minable reserves with extremely low physical-mechanical rock properties which drastically come in contrast with known deposits of Russia and other countries.

Just these rock properties together with complicated hydrogeological conditions of the deposit and considerable depth of mining (down to 450 metres) had jolted researchers to the thought about use of non-conventional technique for mining such a deposit, i.e. geotechnological method which enables to extract the underground mineral directly in situ, thus minimizing the effects on the environment. By this one eliminates all unproductive procedures of breaking, haulage, transporting and minimizes costs for opening and developing the deposit.

This work deals with substantiation of hydrogeomechanical mining method (MHGM) on the "Lomonosovskaya" pipe; the method was specially designed with regard to specific conditions and combines the original technique for isolating the aquifer by means of ring slit followed by deposit mining through boreholes from the surface, these boreholes being located and involved into operation along the spiral line. Preliminary loosening of a rock massif and its wash-out by hydraulic monitor along with simultaneous airlifting of ore with various grain-size distribution provide for the maximum ore product extraction.

A set of theoretical and laboratory investigations has shown the feasibility of the process being suggested, and the first stage of experimental pilot work has corroborated the rightfullness of adopted engineering decisions.