

Elaboration and Application of New Technologies for Exploration and Mining of Diamond Deposits in the Arkhangelsk Province

¹Verzhak, V.V., ²Garanin, V.K., ²Kudriavtseva, G.P.

¹Ministry of Natural Resources, Moscow, Russia

²Moscow State University, Geological Faculty, Moscow, Russia

Results of elaboration and application of new technology of exploration and mining works on the objects of the Arkhangelsk diamond bearing province (ADP) are presented. Experiential and commercial jobs were done in during 1982-98.

The system of petrological-geochemical and mineralogical criteria was created for searching of commercial kimberlites. Application of this complex allows to decrease (> 10 times) of of tested rock volumes and decrease of mining jobs time.

For exploration of kimberlites a new technology of bulk sampling with using of large diameter drilling (0.5 - 0.9 m) was applied for estimation of diamond grade, determination of diamond quality and diamond distribution for different types of kimberlites in volume of ore body. Special mobile concentrate complex, jointed with drilling device, was used for selection of heavy minerals. It allowed to decrease of exploration time of the M.V.Lomonosov and the Verkhovina deposits. Efficiency of this technology was connected with decreasing of labor and financial resources, with technical and ecological safety of jobs.

On mining stage experience-commercial works were done with drilling of holes with 4 m diameter on the Karpinsky-1 pipe (M.V.Lomonosov deposit). Commercial party of diamonds (8000 ct) for their commercial estimation (recovery of diamonds 95%) was mined for short period of time. Destruction of diamond for all sizes of crystals was not fixed. Proposed technology of bulk sampling can be applied for exploration and mining of other ore deposits with low grade of useful components.