

of the extracted mineral and partly preserve the original performance of the block (before the water intrusion into the stope).

It is planned to conduct a series of experiments using mathematical models, ore drawing simulation under high deposit inundation taking into account water discharge into the block. It is necessary to determine the impact of the ore drawing process, the status of mining operations in conditions of high inundation and to analyze the influence of the changed ore drawing modes on the quantity of the extracted mineral.

To confirm the research results performed on mathematical models we created a three-dimensional physical model considering mathematical modeling indicators. The result is to clarify the ore drawing regularities in deposit inundation as mathematical parameters and physical components.

We have determined the regularities controlling the efficiency of mining operations under inundation conditions, which reveal their dependency on the changed ore drawing modes, thus increasing the overall productivity of the process.

The authors have calculated the approximate economic efficiency and impact of the measures to prevent inundation. The technical and economic indicators of improving underground mining operations in conditions of high deposit inundation are established.

Further research will allow the authors to determine the optimal modes of ore drawing for various conditions of a stoping face, to establish general regularities of ore drawing in case of secondary inundation. It is planned to determine the dependencies of ore drawing indicators on geological, technological and hydrogeological occurrence modes and iron ore mining at considerable depths.

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ECOLOGICAL PROBLEMS OF KRYVYI RIH MINING

The mining industry has a rather wide range of activities. Extraction of rocks has both advantages and disadvantages. At present, all major disadvantages deal with environmental problems. The reason for this is active and unreasonable human activities. Environmental

problems appeared a long time ago, yet people just did not pay attention to it. Ecological problems are wide spread not only in Ukraine, there are found all over the world .We live in the region where mining is well-developed with two basic mining methods: surface mining and underground mining.

Kryvyi Rih is one of the largest metallurgical centres of Europe. The mining and metallurgical complexes operation produced 252 thousand tons of chemicals emitted into the air in 2016. The enterprises negatively affecting our environment include "Arcelor Mittal Kryvyi Rih", JSC "YuGOK", PJSC "SevGOK" and many others. Gas and dust emission into the air is an inevitable result of open-pit mining technologies. It negatively affects our health. Mining operations destruct hydro-geology of the ground.

The increased amounts of mine groundwater run-offs including many pollutants such as chlorite compounds, a sulphuric acid, solved salts of iron, manganese, copper, nickel, zinc, etc. contaminate the environment. Especially hazardous for people are heavy metals like cadmium, molybdenum, nickel, zinc, vanadium, mercury, selenium, arsenic, lead and others. Heavy metals are easily transported with water and are often concentrated in sediments. The waters accumulated in tailing ponds are continuously drained into underlying sedimentary rocks, causing flooding and salting of fertile soils. It deteriorates the quality of drinking water. The destructed soil structure makes the crops capacity worse in the areas with the developed mining industry. The next problem is estimation and utilization of industrial waste areas. We can decide this problem in the following way: either to leave rocks in exhausted areas or use them as construction materials.

The global ecological crisis is the most important task for people to solve today. We must take care of the environment for the sake of the next generations and ourselves.