СЕКЦИЯ «ГОРНОЕ ДЕЛО, ИНЖЕНЕРНОЕ ДЕЛО, ИНЖЕНЕРНАЯ ЭКОНОМИКА, ЭКОЛОГИЯ»

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POTENTIAL CHANGES OF ENVIRONMENT DURING OPEN-PIT MINING

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When open-pit mining is performed, several circumstances should be carefully considered: impact on the surrounding of the quarry and potential changes that must be foreseen before the development begins.

The most significant impact mining projects have on water quality and water supply in the mining area. The key question is whether the reserves of surface and groundwater will remain suitable for meeting human needs and whether the quality of surface water in the mining area will remain acceptable for maintaining the pristine flora and fauna of water bodies, as well as terrestrial wildlife. In some cases, the extraction of sand and gravel mixture is not considered as a major consumer of water resources. The source of water drinking water supply might be the water delivered from outside. For most mining projects, the potential for soil and rock erosion is a major concern, resulting in deteriorating surface water quality.Due to the fact that large tracts of land are disturbed by mining operations and large volumes of loose materials remain open in the mines, erosion can become a major problem for mining enterprises. The impact on land resources in the implementation of design solutions consists in the possible contamination of the soils of the quarry as a result of the deposition of pollutants from the atmosphere, leakage of various types of fuel and lubricants (petroleum products).

The main types of impact on the environment during the development of quarries are: withdrawal of natural resources (land, water); air pollution by emissions of gaseous and suspended substances; noise pollution; changes in the topography of the territory, hydrogeological conditions of the construction site and the adjacent territory; contamination of the land claims by the waste products and waters; changes in the social conditions

of the population [1]. When considering the potential ways of entering pollutants into the environment during the mining activity, two stages should be paid attention – development stage and land restoration stage. At the development stage the following should be considered – emissions of pollutants from technological equipment may enter the atmospheric air, including exhaust gases from motor vehicles; noise emissions; impact on flora, fauna; filtration through the aeration zone of surface wastewater. Also, at this stage, pollutants will be released into the air during mining, roofing works, and vehicle operation. The main pollutants will be dust (solid particles), carbon monoxide, nitrogen dioxide, soot, paint aerosols, etc. At the land restoration stage emissions of pollutants from motor vehicle during the mining-engineering process may also enter the atmospheric air.

To eliminate or partially compensate the factors mentioned above, the following environmental protection measures should be preventively carried out: in places of possible runoff of surface (rain and melt) waters into the territory of a quarry, it is important to carry out the driving of upland ditches or embankments along the perimeter of the boundaries of the land plot, which will allow organizing the drainage of surface wastewater through the existing drainage system places of natural flow; the area of the open pit mine should not exceed the standard area.

The developed areas should be immediately filled up with rocks of the main overburden for further recultivation; to prevent contamination of groundwater during mining operations with a flooded production bench, backfilling of the main overburden rocks formed as a result of mining operations in water-cut reservoirs shall be carried out; to locate intra-quarry roads on elevated places of the quarry foot; work platforms for mining equipment should be located at elevated areas of the pit bottom, and if there is no such opportunity, backfill with rocks of the main overburden to ensure the thickness of dry cushions is at least 1.0 m.

References

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