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Hydrogeological and Engineering-Geological Characteristics of the Handise Field

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Abstract This work is devoted to the study of the hydrogeological and engineering-geological conditions of the Handise deposit. The study analyzed the groundwater system, water capacity, water movement characteristics and geological composition of the deposit area. From an engineering-geological point of view, the stability of the deposit, ground surface movements and changes under the influence of water were assessed. The results provide important recommendations for the design of structures and construction work.

Keywords: Handise deposit, Hydrogeology, Engineering geology, Groundwater, Water capacity Soil properties, Geological conditions, Stability, Water influence

Introduction

Various types of deposits of solid minerals located in the peculiar geomorphologies of climatic, geological and tectonic, hydro geological, engineering and geological conditions are explored and developed on the territory of the republic.

Most of the deposits, especially in mountain and foothill areas, are exploded and exploited by galleries and mining methods. The length of individual excavations sometimes reaches more than 5000 m at depths of up to 600 m. In all horizontal and inclined mine workings, various types of deformations are often formed, with different volumes and different frequencies.

Among the explored and developed deposits, the Khandizinsky ore field of the South Uzbekistan mining region located in the central part of the Surkhantau mountain (south - eastern branch of the southwestern spurs of the Gissar range) is the most unique in the geological structure in high mountainous, complex geomorphologic conditions.

Relevance

The deposit represents a high-mountainous, heavily dissected terrain, abs. mark from 1300 to 2800 m. The relative elevations of the mountains over the valleys and bays of the sais reach 500-600 m. The mountains have steep, steep slopes, river valleys and sais are narrow V-shaped, in places the canopy is figurative. Strong dismemberment of the relief predetermines the development of various exogenous - geological processes that contribute to the uneven distribution of surface and

groundwater. The arid climate is characterized by dry summer and relatively short-term precipitation in winter.

The annual amount of precipitation is up to 600 mm and in is directly dependent on the geomorphologic and hypsometric conditions of the ore field. In the ore field under consideration, the conditions for the formation of groundwater are closely interrelated with atmospheric precipitation. Sharp surges on the increase of water inflow in mine workings are not observed; the main increase is observed in the spring period (March, April), as well as in the autumn (November). Maximum water inflows into the mine workings coincide with abundant precipitation.

Method

In 2012, 540 mm fell and, accordingly, the average annual water inflow into the mine workings increased, which reached 40 l / s. The hydro geological features of the Khandizinsky ore field directly depend on the litho logical composition of the rocks, the geomorphology of the terrain, the tectonic structure, the river flow and atmospheric precipitation. According to the conditions of occurrence and feeding, circulation and discharge of groundwater, ground and fractured waters of Paleozoic rocks are distinguished. Fissured waters are dominant, confined to rocks of different litho logic composition in zones of intensive fracturing and tectonic disturbances, through which groundwater flows through the infiltration of atmospheric precipitation and surface water. In the formation of groundwater in the field, the main role is played by waters of infiltration origin.

Solution

The water inflows into mountain excavations are formed mainly from fissured waters of the Paleozoic sequence, and in the horizon of 1020 m they make up 40-50 l / s with a mine workings length of about 3.0 km, and along the horizon 1954 m with a mine workings length of 420 m -20-25 l / s.

The specific linear water inflow in the horizons is:

$$q_l = (40 - 50):3 = 13{,}3 - 16{,}7 \text{l/s pog. km},$$

$$q_l = 47{,}6 - 52{,}5 \text{ l/s pog. km}.$$

The chemical composition of the fissured water hydrocarbon ate-sodium, magnesium, calcium first and second types, mineralization up to 1 g / l. Water inflows into mountain workings are formed mainly due to drainage of fissured waters, opened by mining workings (drifts, galleries) and self-pumping wells, previously drilled. Underground waters affect the stability of mine workings due to the moistening of litho logical differences in rocks. Strength indices of shale's and marls of different composition and properties in the water-saturated state are reduced. Inflows to mine workings at project marks of 1170 m and 800 m should be taken increased by 3-5 l/s.

The productivity of the pouring for the horizon is 800 m is 38 l / s. Surface water constantly affects the level regime. Within the maximum and minimum levels, micro crack indices of ore-bearing rocks change, and as a result, the rock strength decreases to 30% [3]. Underground waters have a double effect on the state of stability of mine workings due to wetting; strength indicators and retention capacity are reduced, and physical properties are increased (volume weight, humidity, etc.), here collapses, dips and other processes are formed.

In the geological structure of the ore area, the volcano mainly participates in the gene sedimentary thickness of the lower section of the carboniferous, the metallogenic formations of the lower Cambrian part, the sedimentary rocks of the Triassic and Jurassic systems, and the Quaternary

sediments with low thickness. The main feature of the geological-tectonic structure is a complex folding, with the presence of flexural and discontinuous folded faults, unfavorable mining and technical operating conditions, as well as the block structure of the ore field. In the area and depth, geologists distinguish more than 20 tectonic blocks, the amplitude of displacement of which on individual blocks reaches 500 m horizontally and up to 100-150 m vertically. The block structure of the rock massif determines the degree of uneven water cut in the structural blocks in terms of area and depth. In these zones, the rocks are grinded, broken into large and small debris, strength indexes are an order of magnitude lower. The most unfavorable for the stability of mine workings are the disturbed zones located parallel along the mine workings.

So, proceeding from the features of the geological structure (in this region there are rocks that are not sustained in terms of thickness and strike, which are divided into different blocks), the state of stability of mine workings is determined. Geological features are predetermined by the block structure of the mining region (field) and affect the degree of watering of the structural blocks. The strength parameters of the rock massif gradually decrease, to the critical state, the deformation occurs in the worked out space. In these zones, sub-pressure water is formed due to hydrostatic pressure, various types of engineering-geological processes are formed and propagated in mine workings (caving, dumping, stone rock falls).

Conclusion

The diversity of the geological-tectonic and geomorphologic structure, as well as the uneven watering of the ore field, predetermined the complexity of the mining and technical conditions for exploration and development of the Khandiza deposit. Landslides, weathering, screeds are widely developed on the surface and along the access roads to the galleries, and collapse, collapse, decomposition, etc., within the mine workings. Thus, the geomorphologic-climatic, geological-tectonic, hydro geological-engineering-geological features of the Khandizinsky deposit predetermined the complexity conditions and technology of exploration of its development.

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