WEB OF SCIENTIST: INTERNATIONAL SCIENTIFIC RESEARCH JOURNAL
ISSN: 2776-0979, Volume 3, Issue 6, June, 2022

ON THE FEATURES OF CHANGES IN HYDROGEOLOGICAL CONDITIONS DURING THE DEVELOPMENT OF THE YOSHLIK DEPOSIT

Gaibnazarov B. A.
Senior Lecturer, At the Almalyk branch of the Islam Karimov
Tashkent State Technical University

Abstract
The article deals with the issues of formation, filtration, movement and conditions of occurrence of groundwater in the area of the deposit. The factors of water inflows leading to the accumulation of groundwater during the development of the deposit, the nature of the watering of Paleozoic deposits along all sides and ledges are given. The study found that the regime of water manifestations is characterized by seasonal changes in precipitation. The results of chemical analyze of groundwater are presented; a forecast is made about possible changes in the chemical composition of groundwater during the development of the deposit. Information is given on the conservation of heads, leading to a decrease in the stability of ledges, sides and to the moistening of a mineral, a decrease in its quality characteristics.

Keywords: Watershed, tributaries, groundwater horizons, depression funnel, technogenic, regime, quarry, fault, erosion basis, tectonic fault, attenuation of fracturing, filtration, wedging out, groundwater discharge, sides, ledges, watering, head conservation, local sources.

Introduction

The Yoshlik deposit is located in the Northern block in the basin of the Almalyksay river, which is the left tributary of the Akhangaran region. From the east it borders on the Kalmakyr deposit, from the south - on the Karamazor mountains, from the northwest - on the Karabulok deposit.

The Almalyksay River originates from the watershed part of the Kuraminsky ridge, flows from the southeast to the northwest, obeying the general direction of lowering the relief surface of the northern slope of the ridge.

Discussion

In accordance with the geological structure and circulation conditions in the area of the Yoshlik deposit, underground waters of alluvial-proluvial deposits of the quaternary age of the Almalyksai valley, as well as waters of fractured carbonate

intrusive and igneous rocks of the upper Paleozoic, became widespread [1]. The latter are of practical importance in connection with the further exploitation of the deep horizons of the quarry. Intrusive rocks occupy more than 55% of the area of the deposit, volcanogenic strata - about 40%, stratified terrigenous and carbonate deposits - less than 5% [2].

In 1984, the channel of the Almalyksai was blocked in the upper reaches by a dam and the water was diverted into a tunnel (600 m long and 6 m² in section), passed under the ridge and going into the Nakpaisai valley. In order to divert the underflow, a basement dam was built in the upper reaches of the river.

As a result of 4 years of development (mainly overburden work) of the deposit, a small mined-out area with a depth of 20-40 m was formed.

During the development of the deposit, there will be a systematic decrease in the natural level of groundwater in the form of a depression funnel. Such a change in the natural regime of groundwater will continue throughout the entire period of excavation, i.e. the technogenic regime of groundwater is formed in the area of the deposit. Prior to the start of development, the depth of natural occurrence of groundwater in the area of the deposit was 25 - 38 m. Hydrogeological studies indicate that the natural movement of groundwater occurs from local watersheds to the local base of erosion to the north, northwest in accordance with the general slope of the terrain.

The hydrogeological conditions of the deposit are closely related to the geological structure, the nature of the relief, climatic and orographic conditions. In this regard, on the area of the Yoshlik deposit, the following stand out:

1. Aquifer of contemporary alluvial deposits;
2. Underground waters of the zone of open fracturing of hydrothermal-metasomatically altered rocks of the middle Carboniferous;
3. Underground waters of the zone of open fracturing of carbonate rocks of the upper Devonian - lower Carboniferous.
4. Underground waters of the zone of open fracturing of lower Devonian rocks and predominantly metamorphic rocks of the Ordovician-Silurian.
5. Underground waters of the zone of open fracturing, predominantly acidic to a lesser extent, medium intrusive rocks of the middle - upper Paleozoic.
6. Fissure-vein waters of zones of tectonic disturbances.

According to the lithological composition of the water-bearing rocks, according to the conditions of accumulation and circulation, according to the depth of distribution and the forms of occurrence in the deposit, the following types of groundwater are distinguished:

1) Fissure-ground and fissure-vein waters;
2) Porous-ground waters of modern deposits.

Fissure-ground waters are spread over the entire area of the sites, forming mainly in its exposed part. The watershed surface in the described area is composed mainly of effusive and intrusive rocks, broken by local and regional cracks. The relief of the watersheds has a flat shape, which favors the penetration of atmospheric precipitation into the rock mass, which is the only source of nutrition for fissure-ground waters.

The water content of the rocks that make up the area of the Yoshlik deposit depends to a large extent on the degree of their fracturing. Igneous rocks in terms of their physical and chemical properties represent a medium that is hardly soluble for water. Therefore, atmospheric precipitation penetrating into them circulate mainly within the upper zone of extended fracturing. Regional fracturing, according to geological exploration data, in the area of the deposit is developed to a shallow depth, about 100m. Moreover, with depth, the fracturing decreases and, consequently, the water permeability of igneous rocks decreases. Therefore, the relatively small amount of atmospheric precipitation falling in the area and the shallow development of fracturing in igneous rocks excludes the possibility of accumulation of significant reserves of fissure-ground water in them [3].

At present, the bottom of the quarry is located 55 m above the water line of the Almalyksay region. In the future, the quarry will open up both the main faults - Karabulaksky, Kalmakyrsky, and others, accompanied by a whole series of minor disturbances. In the future, as the quarry deepens, the main factor in the accumulation of groundwater is the mining and geological conditions during the development of the deposit. The next most important factor in the formation of water inflows is the waters of the Almalyksay region. Their entry into the quarry will occur by filtration through the rocks of the Paleozoic. Actual water inflows help to identify the main patterns of the relationship between river and fissure waters.

The regime of fissure-ground waters is formed under the influence of atmospheric precipitation and evaporation. Groundwater recharge occurs in the high-mountain part of the region, level fluctuations follow directly the change in the amount of precipitation.

The movement of fissure-groundwater in the deposit area follows three directions:
1) According to the general slope of the relief, from the southeast to the northwest;
2) Away from the watershed;
3) To local cracks-faults.

As the flow of fissure-groundwater moves down the watershed from the supply area to the runoff area, the level gradually sinks and the level fluctuations lag behind the change in meteorological factors increases.

The rise in the level of fissure-ground waters begins from the end of February - the beginning of March. The maximum position of the level of fissure-ground waters was noted at the end of May - beginning of June. From mid-June, the decline in the level begins and continues until October - November. The minimum position of the level is noted in November.

The mineralization of these waters varies from 220 to 800-900 ml/l. Moreover, the mineralization increases as the flow of fissure-ground water moves from the area of supply to the area of discharge.

Fissure-vein waters of the deposit area are confined to faults and their feathering cracks. The Karabulak and Kalmakyr faults with feathering cracks pass through the area of the deposit. Moreover, the Karabulak fault can be traced in the northern part of the site, outside the deposit. There is no information about its water content.

The Kalmakyr fault in the area of the deposit is very weakly watered.

The consumption of fissure-vein waters during the year is subject to slight fluctuations. If its maximum value in April - June is 12.5 l/s, then for the period of minimum flow rates (winter period) this value will decrease only to 9.3 l/s.

In places of deep erosion, when cuts in river valley's cross fault zones, they come to the surface in the form of springs with a flow rate of 0.5 to 1, less often 10-17 l/s. The discharge of these springs is relatively constant.

Fissure-vein waters are mainly fed by fissure-ground waters and partly atmospheric precipitation. Waters of this type have a small areal development, since they accumulate only in the zones of development of local fracturing.

The mineralization of fissure-vein waters is somewhat higher than fissure-ground waters. According to the chemical composition, the fissure-vein waters of the deposit belong mainly to the sulphate class of the calcium, less commonly sodium group of the second type.

Water hardness varies from 5.4 to 13.2 mg-eq/l. The dense balance of fissure-ground waters varies on average from 300 to 1040 mg/l throughout the year. However, springs with a dense residue of 2000 or more mg/l are not isolated.

According to O.A. Alenkin waters belong to two classes: 1) sulfate and 2) hydrocarbonate, calcium group, the second type.

In groundwater of both classes, ions are present in an insignificant amount:

NH_4-0,25-1,0 mg/l

Fe- traces, rarer 0,2 mg/l

NO_3- traces, rarer 0,2 mg/l

PH- in annual terms varies from 6.2 to 7.6

Groundwater circulates through the pores of the Quaternary deposits, and within the deposit, they have little development. They are confined mainly to the alluvial pebble deposits of the Almalyksai.

The maximum groundwater flow in Almalyksay is 32 l/s, the minimum is 10 l/s. The filtration coefficient of pebbles is explained by the fact that the aggregate of alluvial deposits contains a very large amount of clay material. According to the chemical composition, the waters are hydrocarbonate, calcium, with a dense residue of 0.16 - 0.28 g / l. The total hardness of water is 1.3 - 4 mg-eq / l. The amplitude of fluctuations in the level of groundwater in the deposit reaches 5 - 6 m. The maximum level occurs in April - May due to infiltration of surface waters. From mid-May, a sharp decline in the level begins, lasting until October. Groundwater is fed from atmospheric precipitation.

Based on the above, the following conclusions can be drawn:

1) Hydrogeological conditions of the Yoshlik deposit are simple;

2) All water-bearing deposits confined to identified aquifers and zones have poor filtration properties;

3) Under the existing conditions of mining the deposit in a quarry way, the entire upper part of it, including the zone of intense fracturing, is weakly watery, as indicated by individual water manifestations with a flow rate of up to 0.35 l/s, and weak moistening of individual sections of the bottom of the quarry deposit;

4) Changes in water inflows occur in the context of the year, depending on the distribution of precipitation and temperature;

5) The role of regional faults in the watering of the open pit is insignificant;

6) The average value of the filtration coefficient for fissure-ground waters is 0.004 m/day; for fissure-vein waters - 0.127 m/day; in general, for the deposit - 0.065 m/day. Despite the complexity of the geological structure of the Yoshlik deposit, intense tectonic disturbance of rocks, groundwater will not be a deterrent or an obstacle to the development of the deposit.

Analysis of water inflows into the Yoshlik quarry for the period of low water (September), when water inflows are formed only due to Paleozoic fissure waters, similarly to the deposits of the Almalyk ore deposit, the specific water inflows into the quarry (for each meter of deepening) will average 0.23 l/s. So, when deepening the quarry by another 75 m, another 18.0 m/sec is added to the present value of water inflow. Consequently, the total water inflow into the quarry will be 13.7+18=31.7 l/s.

Thus, the total expected water inflow into the open pit will be:

The maximum annual average is 32-44 l/s;
The maximum average monthly - 63-75 l / s;
Long-term average - 29-41 l/s.

References

1. Медно-порфировые месторождения Алмалыка, Ташкент, Фан. 1974. С-29.
2. Медно-порфировое месторождение Дальнее. ГГО Ташкентгеология, М: Недра, 1983. С-6
3. Исоматов Ю.П., Шакаров Б. Горнов В.А. О формировании техногенного режима подземных вод при разработке месторождения Кальмакыр. Горный вестник Узбекистана №4. 2006. С-22.