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TAILINGS DAMS IN THE REPUBLIC OF MACEDONIA

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Abstract

Flotation Tailing dams if not built and managed by all the norms and standards, can pose environmental bombs. They can be big polluters vicinity of surface and groundwater and the air. So, by land, water and air, these operating environment and the entire flora and fauna. Flotation reagents used in the technological process, and dissolved salts of heavy metals are usually present in waters discharged from Tailing dams. These waters, in addition to the remains of flotation reagents (xantates, phenols cyanides compounds high alcality or acidity), containing heavy metal ions, and low content of oxygen and other impurities.

INTRODUCTION

In Macedonia there are four active flotation *Tailing dams* within mines: Mine - Radovish (chalcopyrite copper ore), Zletovo - Probistip, Sasa - Macedonian Kamenica and Toranica -Kriva Palanka (poly mineral lead-zinc ore). These mines, after the delivery of technological process flotation useful components, creating slag which in poly metallic lead - zinc ore represents about 88% of the total processed round of the table, while in mono mineral copper ore this percentage is greater than 98%. For the purpose of disposal of this slag all these mines have built tailing dams.

The tailing dam Topolnica - location arid is located about 1.5 km from the flotation plant and about 10 km from city Radovish. Tailing dam is situated along the river Topolnica, with the dam consists of an initial wave, which is then upgraded with the sand fraction, while postponing dressing accrue lake. As in the technological process of mine processed mono mineral raw material, it allows water from Lake sedimentation system pumps (pontoons) returns in the technological process, i.e. water recirculation, the environmental aspect is favorable.

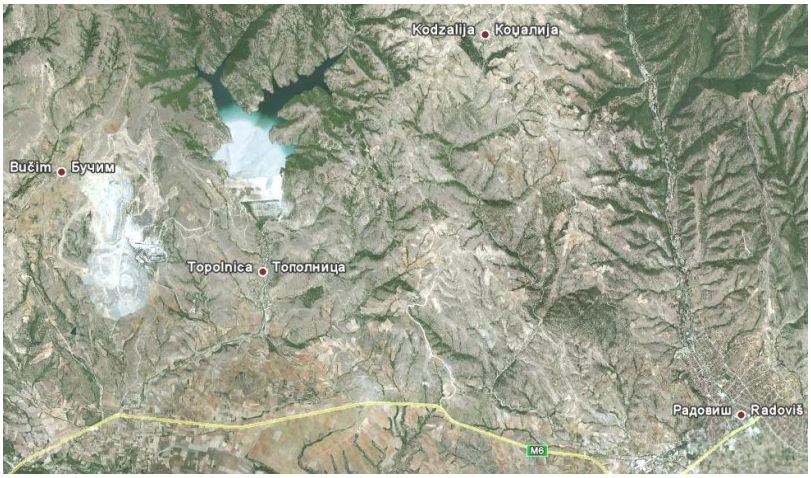

Figure 1. Tailing dam Topolnica

According to the height of the dam arid of about 120,0 m, this tailing dam is one of Europe's highest tailing dams. Beginning of 1979. March and from 2003-2005 the mine did not work. In this tailing dam has been postponed 80.883.605 t slag. Potential danger of tailing dam village Topolnica with a population of about 1,000 residents and located next to the dam, endangering the water flow of the river Topolnica which becomes Lakavichka river, and from which of irrigated agricultural areas about 40.000 ha.

Tailing dam Sasa - located of about 12 km from the city Macedonian Kamenica, about 4 km from the village of Sasa and directly to the flotation plant, Sask River Valley. Needs tailing dam is carried deviation Saska river tunnel lining. Arid Sasa is composed of cascading dams two of which are old and not in use. Active tailing water pour over evacuation overflow body - manifold in water flow Saska River. Arid No.1 was in operation from 1964 to 1974 with a height of 44 m and built up to elevation 1033 mNV arid No.2 was in operation from 1974 to 1990 with a height of 62 m and built to elevation 1.032 mNV while the 1990 in New Tailing dam exploitation of construction in two phases, with the New Tailing dam Phase I is completed and currently in exploitation New Tailing dam II phase, which supersedes the elevation of 975 mNV.

Figure 2. Sasa Tailing dam

So far the processed data from flotation tailings from the mine Sasa calculated amounts of 10.500.000 t slag, the amounts of which a small part is used for zapolnuvanje underground spaces in the mine, and mostly deposited tailing dam from Sasa mine. Potential danger of the active Tailing dam villages downstream Saska River with a population of about 1,500 inhabitants, and the city Macedonian Kamenica with a population of 10,000 residents and threatening the water flows from the river Bregalnica accumulation Kalimanci and used for irrigation of agricultural crops (> 150.000 ha).

Tailing dam Zletovo - is located near the city Probistip directly to the flotation plant. Accumulation space is located along the river Kiselicki (deviation open channel). There are five јаловишта, four together, and fifth (new) is independent. The construction of dams is with sand hydro cyclone - flotation tailings, while dressing hydro cyclone delay sediment lakes. The poured water from the new (active) Tailing dam pour over evacuation overflow body - manifold Kiselicka river. Arid No.1 was in operation from 1928 to 1944, arid No.2 and No.3 were in operation from 1945 to 1970, arid No.4 was in operation from 1970 to 1976, and then started with the exploitation New Tailing dam construction in two phases, in which exploitation is New Tailing dam Phase I, which will be operational to elevation 495 mNV height of 51 m. Subsequent delay in operation will be New Tailing dam II phase, which will be built to elevation 505 mNV height of 61 m.

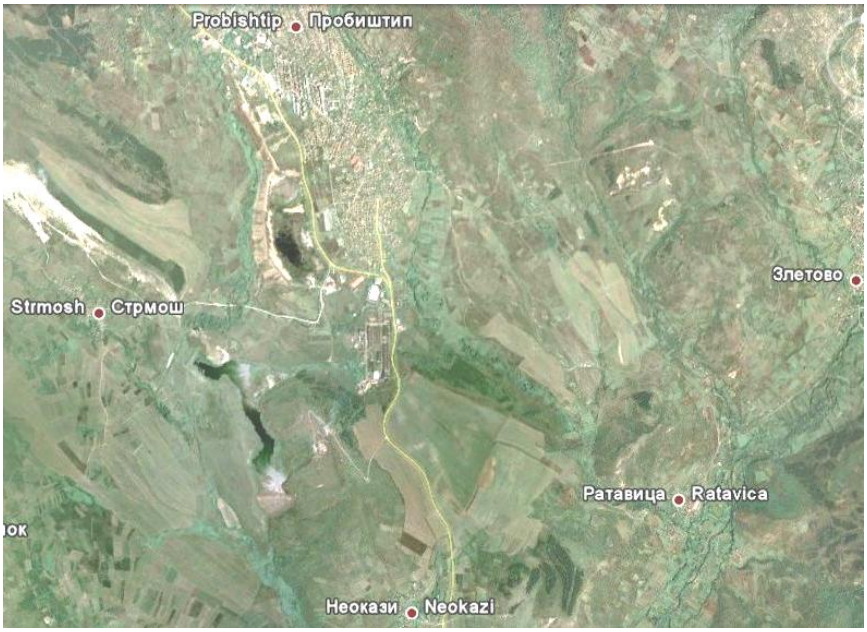

Figure 3. Tailing dam Zletovo

So far the flotation tailings disposal Zletovo mine is delayed approximately 10.300.000 t slag. Potential danger of arid villages downstream Kiselicka river with a population of about 500 inhabitants, threatening the water flows from the river Kiselicka which flows into the river Bregalnica, and that water is used for irrigation of agricultural crops (> 50.000 ha).

Tailing dam Toranica - is located in the valley of the river curve, 4 km downstream from the flotation plant and about 10 km from the city Kriva Palanka.

Needs tailing dam is carried deviation curve river tunnel lining and the area upstream is surrounded by stone-earthen dam retention. Sand dam built downstream hydro cyclone flotation sand, while dressing hydro cyclone deposited in Lake accrue. The poured water from Lake past through evacuation overflow collector, while at the moment because of the dam upgrades retention evacuation of water from Lake is done with the help of water pumped through the collector and the collector through present ponds is discharged into the river curve.

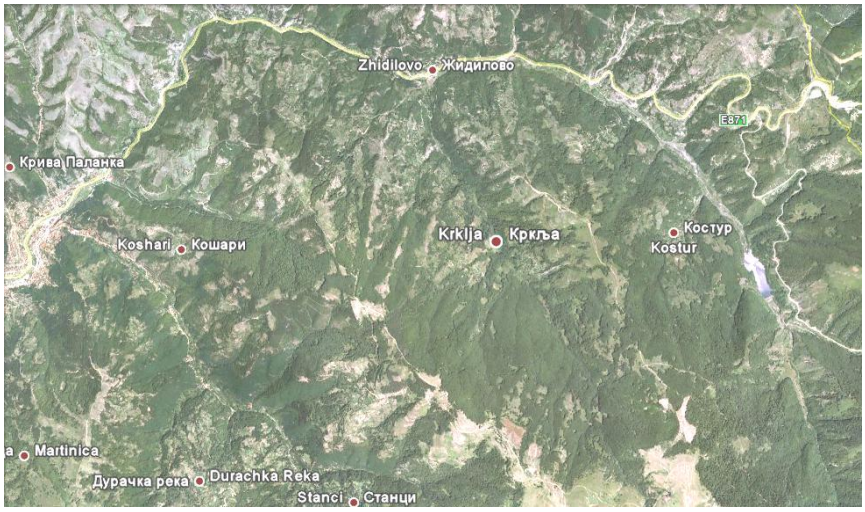

Figure 4. Tailing dam Toranica

Beginning of the 1987 exploitation arid. So far the flotation tailings disposal in this tailing dam had been postponed 2.000.000 t slag. For future exploitation provides freeboard to elevation 990 mNV ie total amount of sand dam of about 70 m. Potential danger of arid villages down the river curve, with a population of about 750 inhabitants, threatening the water flow of the river curve, as well as the city Kriva Palanka with a population of about 15,000 residents. Impact tailing dams on the environment in terms of design and controlled exploitation can be viewed through the following elements: - Taking of land for their formation; - Pollution of surface waters with excess discharge or overall taking Lake with discharge of drainage water; - Pollution of groundwater flow filtration and waters; - Air pollution with fine particles of dried tailings that washed up under the influence of air currents; - Pollution of land deposition of particles blown by wind or its contamination with polluted waters; - Potential danger of accidents in the destruction of dams, with penetration of the tailings through facilities (manifold, tunnel lining, manhole, other pipelines, etc..), Which can result in major damage and possible casualties.

In considering technological parameters should strive to locate arid place that is close to the plant, does not jeopardize its extension, then place the pulp can be transported gravity for a greater period of time, a place that provides capacity arid least 15 years exploatatrion or in small mines their goal exploitation life. As a rule, you should try to take a smaller area by providing a stable height. It is very important to avoid locating arid places with a possible disaster would cause casualties or major damage. Because of this arid should not be located despite over populated areas, road transport, railways, military facilities, industrial enterprises, in addition to drinking water sources and reservoirs, accumulation etc..

Environmental evaluation of the site has long been bypassed. But degradation environment has reached such a level contemporary design can not be imagined without the analysis and evaluation of the environmental conditions of the location of the mine. This is necessary because tailing dam tacitly turned into collector all contaminated materials arising in technological process. To reduce pollution lesser extent, ie would reduce subsequent investments in secondary care is necessary environmental parameters to consider another time locating mine. So arid to locate low-bandwidth field, outside of the

important directions of airflow, away from streams, springs and arable agricultural land and should certainly intensive use of new geo synthetic materials

CONCLUSION

How to avoid or minimize potential adverse environmental impacts of tailing dams. For this purpose, the necessary fundamental changes in the approach when choosing a location for the construction of the tailing dams, tests of the treated area (geo mechanical, hydrological, seismic, etc..) Design techniques (application of new geo synthetic materials) and of course in exploitation of the same .

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