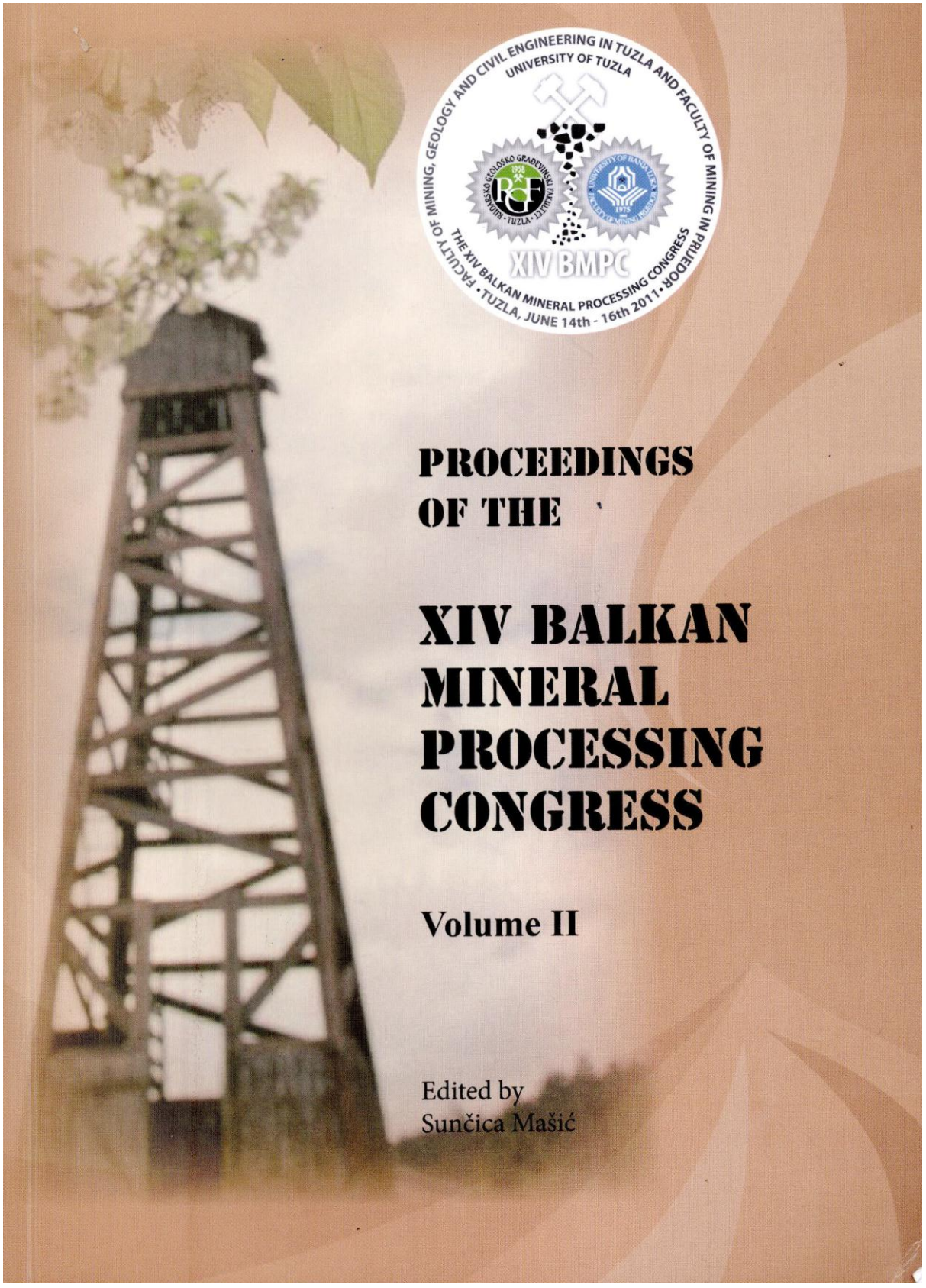

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NEW PERFORMANCE AND DECISION FOR RECYCLING TECHNICAL WATER FROM TAILING POND IN THE BUCIM COPPER MINE

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Abstract: *The improvments and new decision of the pipeline of recycled water from the tailing pond to the flotation concentrator according to the increasing of the tailing dam height will be shown. All estimation of the pipeline calculation and equation present the appropriate sizes of the parameters which have ensured most acceptable conditions for flotation performance in Bucim copper mine.*

Key Words: *recycling, water, tailing, dam,estimation*

1.INTRODUCTION

Tailing ponds provide an important water source for mine operations in Bucim copper mine. Tailings water is usually pumped back to the mill to be reused in the milling process. In this way, mine water is recycled over and over again, significantly reducing the amount of water that must be taken from the surrounding environment. A tailings storage facility is a large area usually located in a natural hollow or valley. In many cases, a tailings embankment are built ofsands from refused flotation tailings (Bucim mine).Once mineral concentrate has been separated from ore as a chalcopyrite concentrate, the remaining tailings are sent via a pipeline to a storage tailings facility.Unlike water dams, tailings embankments are made of coarse sand and have a very wide base. They are engineered structures built to withstand earthquakes, floods and other catastrophic events. They are designed and built to exacting standards enforced by state and experts with employed very best engineering practices and technology. As the volume of tailings material contained in the storage area grows, so too must the height of the tailings embankment and the elevation of the tailings pipeline and each stage of the process is carefully planned.

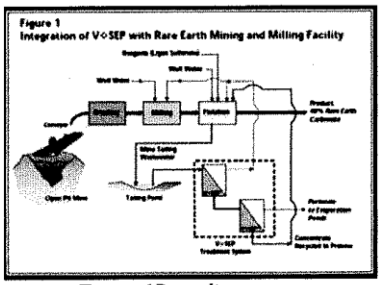

Figure 1Recycling system

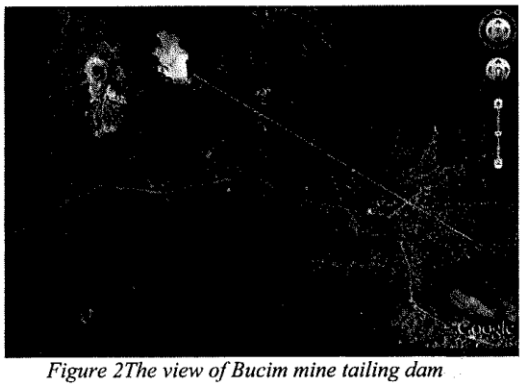

Figure 2The view of Bucim mine tailing dam

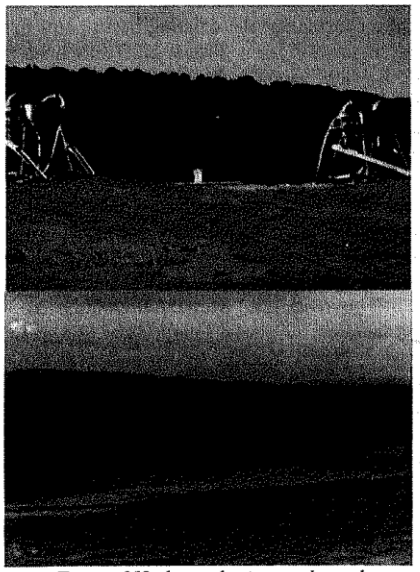

Figure 3Hydrocycloning and pond

The effective tailings management is to design appropriate milling process that produces tailings that are as clean as possible. This means that the mineral content is low, and that chemicals are kept at manageable and predictable levels. Contemporary, priority is to ensure that tailings material remains safely stored. It's achieved by building the dam with permanent structure capable of retaining all of the tailings material over the life of a mine. Over time, the sand and size particles within tailings will accumulate at the bottom of the dam to form a dense layer that is highly resistant to water movement.
The separation of tailings solids and tailings water is an important safeguard for the environment. Not only do tailing solids help contain the tailings pond, they also attract and accumulate the mineral content that exists in tailings water. Over time, as these minerals stabilize in the tailings solids, their risk to people and the environment is minimized.

2. ESTIMATION OF THE TAILINGS DAM PARAMETERS

The reconstruction of the existing system for recycling technological water considering the tailings dam overtoping over the point 630 m, from the technological-technical points of view is result of the following conditions:

a) The demands of the needs for maximum dislocated of the existing floating pumps – pontons (1 and 2), by height up to maximum point of ~ 648 m and length of 714 m (the estimated to the existing level and location), for the future proposed maximum overtoping of the tailings pond of the tailings dam.
b) The small direct height in the relationship of the future overtoping: the existing basin point 623 m and stationary point 1+859 km (estimated from the flotation part),the press back pipeline Φ 508/7 mm, with length of 865,5 m, the point 622 m, according to the existing bond of the stationary and flexible pressback steel pipelines Φ 508/7 mm, with flexible rubber –armired bowels Φ 400 mm, from the floating pumps point 620 m;
c) The small direct height from the existing trapho point station 630 m, which is found close to existing basin point 623 m, the stationary point 1+859 km (estimated from the flotation part);
d) The huge existing total length from 865 m to the existing electrical wires for the electrical motor as anadditionfor the floating pumps at the point 630 m;
e) The small direct height of the existing electrical wire with an pillar point 638 m for supplying with electrical power to the traphostation point 630 m, close to the existing basin point 623 m stationary point 1 + 859 km

The demand of the dislocation of the floating pumps is followed by the setting of the new press back pipeline Φ 508/7 mm, for the capture of the clarified technological water with average lifting of the water level in the tailing pond to 1,8 - 2,0 m.
The concept of the technical decision for the reconstruction of the system for the feedback-recycled technical water with maximum overtoping above to point 630 m, (I, II and III phase, the points 638, 646 и 654 m), is directed by the needs of the ensurement of the following conditions:

a) The dislocation by the height of the existing system to the maximum overtoping of the tailings dam (III phase, point 654 m), with carried out from the following stages:
   - Maximujm dislocation by the length of the 714 m in the relationship of the floating pumps to 620 - 648 m, so so far from the beach of the tailing dam with catching of the clean water from the tailing pond.
   - The determination of the new height location for the new steel pipelines Φ 508/7 mm, close to new basin point 650,52 m, and new stationary point 0 + 110 km which role is to connecting of the pipelines from the existing floating pumps in the tailing pond.
   - The determination of the path of the new press back steel pipeline Φ 508/7 mm from the new basin point 650,52 m, the new stationary point 0+110 km, with the length of 1103 m, up to bond with the existing press back steel pipeline Φ 508/7 mm, point 634,37 m, the stationary point 1+756,9 km considering the basins for the technical water point 686 m. (It's important to note that the existing press back steel pipeline remains unchanged and stretched from the water basins up to the bond from the new press back steel pipeline. It is contained by two directions from 1378,51 m with diameter of the Φ 660,4 mm and 378,39 m with diameter of the Φ 508/7 mm.)
b) The dislocation from the one part of the electrical equipment above to point 650,52 m which ensure new maximum height location of the traphostation and appropriate location for the new dislocated wire point 655 m, the stationary point 2+180 km (estimated from the new basin point 650,52 m);
c) The dislocation of the new route above to point 650,52 m, with weight of the 3.00 m and parallel route with new press back steel pipelineΦ 508/7 mm.

Regarding the demands for the maximum recovery of the existing available equipment (firstly the floating pumps), it's adopted the following conceptual decision:

- Directed catching and pumping of the feedback – recycled technical water from the new location of the floating pumps, points 620 - 648 m, using two existing press back pipelines Φ 508/7 mm,

to the bond of the new basin, point 650,52 m, the stationary point 0+110 km;

- Setting of the new press back pipeline Φ 508/7 mm, with length of 1103 m. The same pipeline will represent the bond between pipelines from the existing floating pumps in the tailing pond and existing press back steel pipeline Φ 508/7 mm. The beginning of the existing press back steel pipeline is found at the point 634,37 m, stationary point 1+756,9 km, (estimated by water basins);
- The building of the new route with the width of the 3.0 m and total length of 1300 m, which will follow the new press back pipeline.
- The recontructioned system for catching and transport of the feedbeck-technical water is forecasted to be with the existing capacity.

Exactly, the estimation and control of the quantity of the feedback-recycled technical water is determined by the content of the liquid phase in the flotation pulp – tailing, as the ratioS : L = 1 : 1,63.

For example, the planned maximum average treated ores, the $Q_{t.max}$= 13.288 t/day, the estimation will be shown bellow in Table 4.

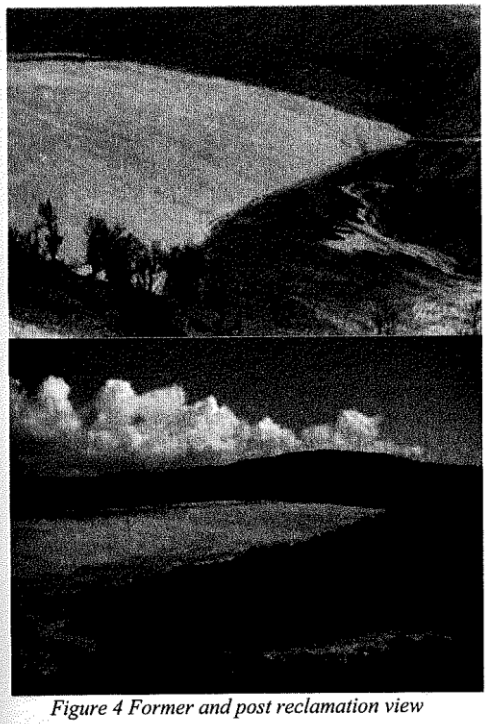

Figure 4 Former and post reclamation view

Table 4 Operation parameters

Tailing	Q_t = 13.288 t/day [38% S, 62% L]	
1.	6.644 t/day	13.288t/day
2.	1 : 1,63	1 : 1,63
3.	10.829,72 t/day	21.659,44 t/day
4.	17.473,72 t/day	34.947,44 t/day
5.	10.829,72[m^3/day]	21.659,4[m^3/day]
6.	13.290,46[m^3/day]	26.580,92 m^3/day]
7.	1,31[t/m^3]	1,31[t/m^3]
8.	1 : 5,40	1 : 5,40
9.	451,24[m^3/h]	902,48[m^3/h]
10	7,52[m^3/min]	15,04[m^3/min]
11.	125,34[l/s.]	250,68[l/s.]

3. CONCLUSION

Tailing ponds provide an important water source for mine operations in Bucim copper mine. Tailings water is usually pumped back to the mill to be reused in the milling process. In this way, mine water is recycled over and over again, significantly reducing the amount of water that must be taken from the surrounding environment. A tailings storage facility is a large area usually located in a natural hollow or valley. In many cases, a tailings embankment are built ofsands from refused flotation tailings (Bucim mine).Once mineral concentrate has been separated from ore as a chalcopyrite concentrate, the remaining tailings are sent via a pipeline to a storage tailings facility.

It's very important to make sure that tailings dam areas are located properly and must be taken to ensure that tailings material is as environmentally friendly as possible. Also, tailings dam must provide for the safe and permanent storage of tailing material, designing the tailings dam to withstand any potential catastrophic event – such as an earthquake or flood, and by controlling the seepage of tailings water.

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