

GEOLOGICAL AND PROCESSING RELATED ASPECTS OF THE PRECIOUS METALS URBAN ORE NEAR BAIJA MARE (MARAMUREŞ REGION, ROMANIA)

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Baia Mare has been a traditional mining region for precious and base metals since the Roman times. The ores have an epithermal genesis, their structures are of vein- and breccia-type and they are related to the Neogene volcanism of the Carpatho-Pannonian area. The metallic mineral assemblages consist of common sulfides, sulfosalts and native gold and silver. Gold appears as free gold, especially in the upper part of the ore deposits, and included in sulfides (mainly in pyrite). Quartz, carbonates, adularia and clay minerals represent the gangue minerals (BORCOŞ & VLAD, 1994).

The active precious metal urban ore (KELLER, 1992) westwards Baia Mare is represented by the Meda tailings dam, built up between 1956 and sometime in the '70s, very close to the residential area. It is an old mining solid waste tip resulted from the mineral processing of the ores from the Ilba, Nistru and Săsar deposits. Quartz, adularia, pyrite, sphalerite, galenite and submicroscopic gold (0.6 g/t) represent the average mineralogical composition of the tailings. The same processing technology was used since the '60s and it was based on the use of cyanide for gold concentration (cyanide leaching). In 1992, S.C. AURUL S.A. company was established as a joint venture between Esmeralda Ranger Exploitation Ltd. (Australia, 50%), REMIN Baia Mare (44.8%) and others (5.2%). Its first objective was gold recovery from the Meda tailings dam. The amount of solid waste at that time was 4.43 million tons. The expected yearly amounts of recovered metals were 1.6 t Au and 9 t Ag.

The technological flow of S.C. AURUL S.A. (courtesy of EPA Baia Mare) involves the mixing of the fluidized solid waste from Meda dam and calcines from Phoenix plant with industrial water containing a high concentration of free cyanide (about 120 mg/l), HCl, and NaOH. The mixture is then electrically dried and melted. The final product is a doré bullion, which is transported to the Metallurgical Plant for refinement. At the end of the process, the solution has 20 mg/l cyanide and it is neutralized by sodium hypochloride down to 4 mg/l. The resulting aqueous solution is stored in another tailings deposit dam, located near Bozânta village (Aurul dam). All the process operate in closed circuit, the waters after the sedimentation of solids in the Aurul pond being reused. The maximum capacity of the AURUL plant: 3.5 million tons/year, the approved operating capacity: 2.0 million tons/year, the total amount of wastes processed until now: 1.6 million tons.

References

- BORCOŞ, M. & VLAD, Ş. (1994). Plate tectonics and metallogeny in the East Carpathians and Apuseni Mts. Field trip guide, IGCP Project No. 356. 43 p.
- KELLER, E.A. (1992). Environmental Geology. Macmillan Publishing Company, New York. 521 p.