

Critical raw materials enrichment processes associated with tailings processing at the Cauquenes tailings deposit plant

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The Cauquenes tailings deposit is located in the central valley of Chile, 12 km southeast of Rancagua. It is currently being reprocessed by Minera Valle Central S.A. (MVC) for the extraction of Cu and Mo. The processed material passes through the plant with a series of physical and chemical separations. In order to find enrichment processes in REE and other critical raw materials, samples have been taken in intermediate parts of the separation process, with a total of 32 points. These samples have been taken bi-monthly for a year to validate statistics.

The plant samples were subjected to ICP-MS and ICP-OES analysis using a previous multi-acid digestion (HCl-HNO₃-HF-HClO₄) and have been compared with the average concentrations obtained for the tailings deposit of Cauquenes.

From the results, an enrichment process is observed for REE, Co, W, and Ba, which are being enriched practically in all the sampling points within the plant, being possible to evaluate the viability of recovering them as a by-product of the extraction process of the Cu and Mo.

According to the maximum concentrations obtained in the different sampling points, an increase in the concentrations of Cu and Mo are being enriched in economically viable concentrations, mainly during the process of collective flotation. This occurs mainly in the different concentrates and tails generated after the 1st, 2nd, 3rd and 4th cleaning processes. Also in the Scavenger concentrate (CS). At these points the highest enrichment factors of Zn, Pb, Cd and Sb are also reached, which can be extracted as a byproduct of the Cu and Mo extraction process.