

Can old tailings disposals become mineral resources? A Portuguese case study

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ABSTRACT

The demand for valuable minerals and its supply risk in the mining world impose conditions to the industry to proceed of development mineral sources alternatives. Old tailings may represent a solution in providing some valuable minerals as secondary resource and reducing environmental liabilities of abandoned dams. Re-mining tailings is a robust project and requires a comprehensive study concerning the availability and the quality of these “new” mineral resources.

The European Union has considered tungsten as a critical raw material, and Portugal has a historic of mining this valuable heavy metal. The European Union has considered tungsten as a critical raw material, and Portugal has a historic of mining this valuable heavy metal. Therefore, a Portuguese abandoned tailings dam with considerable contents of some minerals is a case study in a re-mining project. It is expected that recovery of tailings present in Cabeço do Pião provide significant content

of Tungsten and Zinc. Through previously studies were proposed two small modular reprocessing circuits: one of zinc and on of tungsten.

Optimization models has been widely used to help decision makers in assessment about the feasibility engineering project's. Hydrometallurgical process of tailings was modelled and optimized. The main objective of this paper is presents the prediction of tungsten and zinc recovery, through an experimental data fitted to linear regression models. Which were used to refine Pareto optimal combinations of the operational conditions of the tailings re-processing circuits. Finally, with the available data, discern of the maximum recovery of theses metals, which may achieved.

keywords: tailings, re-mining, tungsten, raw-materials, pareto optimal