# Tridimensional modelling and resource estimation of the mining waste piles of São Domingos mine, Iberian Pyrite Belt, Portugal

Alexandre Vieira (1,4), João Matos (2,5), Luis Lopes (1,3,6), Ruben Martins (1,7)

(1) Universidade de Évora, Escola de Ciências e Tecnologia, Departamento de Geociências, Évora, Portugal .
alexanderv@live.com.pt, (2) Laboratório Nacional de Energia e Geologia (LNEG), Geological Survey of Portugal, Beja,
Portugal, (3) Instituto de Ciências da Terra (Earth Sciences Institute), FCT, Portugal, (4) alexanderv@live.com.pt, (5)
joao.matos@lneg.pt, (6) lopes@uevora.pt, (7) rubenvm@uevora.pt

Located in the Iberian Pyrite Belt (IPB) northern sector, near the Portuguese/Spanish border, the outcropping São Domingos deposit was mined since Roman time. Between 1854 and 1966 the Mason & Barry Company developed open pit excavation until 120 m depth and underground mining until 420 m depth. The São Domingos subvertical deposit is associated with felsic volcanics and black shales of the IPB Volcano-Sedimentary Complex and is represented by massive sulphide and stockwork ore (py, cpy, sph, ga, tt, aspy) and related supergene enrichment ore (hematite gossan and covellite/chalcocite). Different mine waste classes were mapped around the old open pit: gossan (W1), felsic volcanic and shales (W2), shales (W3) and mining waste landfill (W4). Using the LNEG (Portuguese Geological Survey) CONASA database (company historical mining waste characterization based on 162 shafts and 160 reverse circulation boreholes), a methodology for tridimensional modelling mining waste pile was followed, and a new mining waste resource is presented. Considering some constraints to waste removal, such as the Mina de São Domingos village proximity of the wastes, the industrial and archaeological patrimony (e.g., mining infrastructures, roman galleries), different resource scenarios were considered: unconditioned resources (total estimates) and conditioned resources (only the volumes without removal constraints considered). Using block modelling (SURPAC software) a mineral inferred resource of 2.38 Mt @ 0.77 g/t Au and 8.26 g/t Ag is estimated in unconditioned volumes of waste. Considering all evaluated wastes, including village areas, an inferred resource of 4.0 Mt @ 0.64 g/t Au and 7.30 g/t Ag is presented, corresponding to a total metal content of 82,878 oz t Au and 955,753 oz t Ag.

Keywords. São Domingos mine, mining waste resources, mining waste pile modelling, Iberian Pyrite Belt, Portugal