

Geology, Discovery, and Development of the Ilovica Porphyry Copper-Gold Deposit, Macedonia

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The Ilovica porphyry copper-gold deposit, southeast Macedonia, was discovered in 2005 and is set to become the first greenfield mine development project in the Balkans in the last 30 years. Euromax successfully completed a feasibility study for Ilovica at the end of 2015. Mine construction is scheduled to commence by the end of 2016, with first production in the second half of 2018. The year-end 2015 proven and probable mineral reserves comprise 198.1 million tons of ore averaging 0.32 g/t gold and 0.21% copper, containing 2.01 Moz gold and 898.9 Mlb copper. The Ilovica copper-gold deposit is located 18 km west of Strumica and 25 km east of the border with Bulgaria. The porphyry copper-gold mineralization is spatially and temporally associated with a 29 Ma dacite-granodiorite stock emplaced into a lower Paleozoic granite batholith. Pervasive advanced argillic, sericite-chlorite, and potassic alteration is largely confined to a 1.5-km² area within and adjacent to the dacite-granodiorite intrusive complex. A well-developed silica-alunite-kaolinite lithocap in the dacitic volcanic breccia is a clear indication that the current erosion level is at the top of the porphyry system; propylitic alteration is absent at Ilovica. The main copper mineral is chalcopyrite associated with pyrite, followed by secondary copper sulfides such as chalcocite, covellite, and bornite. Porphyry Cu-Au-Mo mineralization is expressed at surface by a quartz-limonitic leached stockwork zone ~900 by 600 m in size, containing 0.1 to 0.7 g/t Au, 50 to 400 ppm Cu, and 20 to 100 ppm Mo. Although magnetite is present at surface in only isolated outcrops, ground magnetic surveys clearly define subsurface magnetite alteration as a magnetic high 800 by 300 m, which appears to expand or plunge to the east and south. Surface rock-chip samples, diamond drilling and, to a lesser extent, soil sampling define a large body containing 0.1 to 1 g/t Au coinciding with the zone of stockwork quartz veining. Hypogene copper grades greater than 0.15% are largely due to disseminated chalcopyrite, which is largely confined to the western two-thirds of the stockwork quartz zone. Molybdenum averages 20 to 80 ppm throughout the Cu-Au mineralized zone and is present as molybdenite in quartz veinlets that lack regular distribution. Soil sampling defines a classic low-concentration copper anomaly displaced laterally and downslope from the topographically high leached cap. Soil gold values greater than 0.1 ppm only partially delineate the underlying mineralized stockwork, due to dilution and masking by the relatively barren quartz-alunite talus over much of the subcropping stockwork zone. Drilling has demonstrated some overprinting of the potassic alteration zone at depth, possibly indicating a later porphyry intrusion beneath the main open-pit target.