

GEOLOGY AND MINERALISATION OF THE COPPER HILL AREA

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The Copper Hill prospect is located approximately 40 km north of the city of Orange, within the Molong High, a magmatic arc of Ordovician age. Copper Hill was mined intermittently for copper from 1845 to 1931, with production figures of 3.3kt at 1.4% copper from the supergene zone. The Copper Hill area has been explored in modern times by Anaconda and Amax, in the 1960s, Homestake and Cyprus in the 1980s, and Cyprus, MIM and Newcrest in various joint ventures in the 1990s and early 2000s. More recently Golden Cross Resources Ltd (GCR) has commenced an intensive exploration program which includes over 17 000m of RC and diamond drilling and has recently published a resource, which contains inferred and indicated material, for a total of 105 million tonnes at 0.33% copper and 0.33g/t gold.

Copper Hill is hosted by an igneous complex of diorite-quartz diorite-tonalite. These rocks occur in a distinctive northwest striking magnetic low corridor and intrude the Fairbridge Volcanics of Late Ordovician age, comprising predominantly basaltic andesite. A similar, less explored northwest striking magnetic corridor is evident at Larras Lee located four kilometres to the north. The intrusive igneous complex consists of early and locally well mineralised porphyry bodies that were intruded, and partially assimilated by later less mineralised (intra-mineral) intrusions. GCR has recognised at least four different phases of intrusion. Dominantly northerly striking, narrow, post-mineral dykes cross-cut all mineralised porphyries and generally contain less than 100ppm copper.

A broadly concentric alteration zonation has been identified at Copper Hill from drill core and RC chips. From the periphery to the centre of the Copper Hill hydrothermal system, the following alteration zones are recognised:

1. Porphyry bodies and andesitic volcanic rocks, on the margins of the system exhibit an epidote-chlorite-calcite±haematite assemblage (ECC). At the contact between the volcanic and intrusive rocks, a biotite-magnetite hornfels (BMT) is well developed and epidote-andradite skarn is locally described at the Little Copper Hill prospect, where intrusions are in contact with limestone. The dominant sulphide mineral is pyrite, which occurs as disseminations and veinlets comprising 1-5% of the rock.
2. Closer to the centre of the system, a pervasive sericite-chlorite-calcite assemblage (SCC) occurs within early- and intra-mineral porphyry bodies. Disseminated and veinlet pyrite, with minor chalcopyrite, is intimately associated with this alteration style. Veins comprising quartz-carbonate-pyrite, with strong sericitic haloes, overprint all but the central alteration type (SSC) and locally contain abundant sphalerite, galena and high grade gold up to 30g/t. These tend to occur in well developed structural zones or faults. Copper grades commonly range from 0.1-0.3% and gold grades are 0.1 to 0.2g/t.
3. Immediately surrounding the core of the hydrothermal system is a zone of pervasive sericite-chlorite-magnetite alteration (SCM), which hosts several areas of intense sheeted and stockwork quartz veins, developed in early mineral porphyry bodies. These mostly comprise smoky quartz-magnetite veins that contain centreline chalcopyrite and locally bornite mineralisation. K-feldspar and a distinctive green chlorite, possible after secondary biotite are also locally present. Carbonate-dominant veins are observed to cross-cut smoky quartz-magnetite veins and also host chalcopyrite and minor bornite mineralisation. This alteration type hosts the highest grades of copper and gold at Copper Hill. Grades generally average over 0.5g/t gold and 0.5% copper. GCR

published results from GCHR064, which returned 36m at 1.6% copper and 4.43g/t gold from the Saddle Zone.

4. The centre of the hydrothermal system is characterised by a pervasive sericite-silica-clay assemblage (SSC or phyllic), which hosts open, vuggy quartz-chalcocite-pyrite veinlets and chalcocite, minor bornite and possible digenite disseminations. The chalcocite in this alteration zone is separate and distinctive from a poorly developed supergene blanket, beneath a leached cap. This assemblage is hosted by intra-mineral porphyry bodies. Grades locally exceed 1% copper but gold grades vary from 0.1 to 1g/t.

Mineralisation at Copper Hill first formed during early intrusive stages, probably in the upper carapace and specific structures, as sheeted quartz-magnetite veins, hosting copper and gold. The early mineralisation was subsequently disrupted and assimilated into later, less mineralised intra-mineral porphyries. Remnant fragments of early mineralisation occur as xenoliths in the marginal zones of the intra-mineral porphyry complex. They range in size from centimetre-sized vein quartz xenoliths to "cognate xenoliths", which may contain several million tonnes of mineralised rock. In the core of the complex, coincident with the strong SSC alteration and chalcocite-pyrite mineralisation, no fragments of early mineralisation are recognised.

In conclusion, Copper Hill is a large, multiphase porphyry system, in which well-mineralised, early porphyry phases have been intruded and disrupted by a series of weakly mineralised, intra-mineral porphyry bodies. This has resulted in high grade material being diluted, leading to the formation of a large, but relatively low grade porphyry deposit. Potential remains for the discovery and/or expansion of high grade remnants of the early mineralisation.