Golden Cross Resources
COPPER HILL PORPHYRY Cu-Au DEPOSITS

IGC Field Trip
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The information in this presentation that relates to Exploration Results is based on information compiled by Kim Stanton-Cook, who is a member of the Australian Institute of Geoscientists, is a full-time employee of GCR, and has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity he is undertaking to qualify as a Competent Person as defined in the 2004 Edition of the “Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves”. Kim consents to the inclusion in the report of the matters based on this information in the form and context in which it appears.

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“GROUP 3: ~450-445 Ma porphyries constitute the Copper Hill Suite, emplaced at the beginning of the 3rd phase of arc volcanism. Intrusives of this age form common but relatively small-volume mainly felsic intrusives in each of the volcanic belts. Mainly of dacitic composition, although sometimes extending to dioritic to gabbroic compositions, this suite is expressed mineralogically by the common quartz and hornblende phenocrysts in rocks with >60% SiO2. These rocks have medium K calc-alkaline affinities. These porphyries contain significant amounts of mineralisation in the Molong Volcanic Belt (Copper Hill, Cargo) and in the Narromine Igneous Complex in the Junee-Narromine Volcanic Belt.

GROUP 4: ~439 Ma porphyries were emplaced at the end of the 3rd phase of arc volcanism in all belts except the Kiandra Volcanic Belt. Intrusives are shoshonitic monzodiorite, monzonite, comagmatic with the most of Late Ordovician volcanics in the arc. Mineralised Group 4 porphyries comprise the world-class gold-copper resources at Northparkes and at Cadia-Ridgeway, as well as scattered mineralisation in the Forest Reefs area.”
Copper Hill: Regional Address

153 Mt @ 0.32% Cu & 0.27g/t Au @ a 0.2% Cu cut-off grade
Copper Hill - Basics

• GCR’s flagship copper-gold project contains a JORC-compliant Resource of 493,200 tonnes of contained copper and 1.33 million ounces of gold within a constrained, optimised open pit.

• Copper Hill Igneous Complex of late-Ordovician calc-alkaline, multi-phase dacite-tonalite intrusions within a north-south trending sequence of Ordovician basaltic andesite lavas.
COPPER HILL EXPLORATION HISTORY

• Discovered and mined around 1845 – 60m deep shafts, cross-cuts and unsuccessful reverberatory furnace
• 1850 – 1966 sporadic small scale mining
• In the past forty years, the Copper Hill area and in particular the Copper Hill prospect has been explored by a number of mineral exploration companies and government agencies:
  • 1966-67 - exploration for porphyry copper (Anaconda)
  • 1970s – exploration for copper (Amax Australia, Le Nickel, NSW DMR)
  • 1980s – exploration for copper and/or gold (BHP, Homestake, Cyprus Gold)
  • 1990s – exploration for copper-gold (Amoco-Cyprus, Newcrest and MIM)
  • 2000 to 2007 – exploration for gold-copper (MIM and GCO)
• Between 1984 and 2005, exploration at Copper Hill was undertaken primarily on EL 2290 by a number of companies including Eastern Gold, Homestake, Cyprus Gold, Mount Isa Mines Exploration, Newcrest Mining and Golden Cross Operations (GCO).
• Consolidation of EL’s into a single merged tenement (EL 6391) in early 2005, all exploration has been undertaken by GCO Now 100% GCO.
Copper Hill – Exploration

• Airborne magnetic & radiometric surveys
• Induced Polarisation surveys
• Geochemical surveys
• Geological mapping and interpretations
• Drilling – logging (lithologies, mineralisation, alteration, structure) assigning domains
• Resource calculations
• Mining studies - feasibility
Magnetics and drill assay traces

IP and drill assay traces
Copper Hill IP - Chargeability

2km
Resistivity Model. Red low to blue high resistivity. The green and blue area are coincident with the volcanics.

From: A new survey design for 3D IP inversion modelling at Copper Hill.
R.M.S. White S. Collins R. Denne R. Hee P. Brown
3D Chargeability IP model of Copper Hill with sensitivity controlling the colour saturation.

From: A new survey design for 3D IP inversion modelling at Copper Hill.
R.M.S. White S. Collins R. Denne R. Hee P. Brown
Copper Hill X-Sections
Barren dyke corresponding with low IP chargeability
Greg Corbett’s Evolving Porphyries

STAGED PORPHYRY Cu-Au EVOLUTION

**EARLY**

- Intrusion emplacement and heat transfer.
- Initiation of A & M quartz vein formation and early mineralization.

**LATE**

- B quartz vein formation and continued prograde alteration and mineralization.
- Exsolution of magmatic volatiles.

- Cooling and collapsing of retrograde alteration.

- Continued collapse, D vein mineralization, & post-mineral features.
Sheeted laminated quartz-magnetite-sulphide (M style) veins within intrusion F - DDH107, 257 m.

Sheeted B veins in sericite altered intrusion F. Note the central terminations with sulphide fill - DDH 64, 132m.

Stockwork B veins in intrusion F DDH 107 214m

C vein style sulphides overprinting laminated quartz vein - DDH 64 139m
Later sulphides overprint laminated and B veins – DDH 64 130m

Sulphide fill breccia of a C vein type- DDH 107 232m.

Early chlorite-magnetite alteration cut by later sulphides of a C vein style – DDH 74 248m.

Pyrite-rich D vein with later carbonate - DDH 74 245m
Summary: Very strongly hydrothermally altered, strongly porphyritic dacite or microtonalite porphyry. The rock originally contained abundant feldspar (probably plagioclase) phenocrysts, less common ferromagnesian and quartz phenocrysts and a few microphenocrysts of FeTi oxide and apatite, all set in a rather fine grained, inequigranular quartzofeldspathic groundmass. The rock has been subjected to phyllic alteration, with replacement of feldspar, ferromagnesian, FeTi oxide and groundmass components by an assemblage of sericite, quartz, subordinate carbonate and pyrite, and traces of rutile/leucoxene, chalcopyrite, tetrahedrite and sphalerite. About a pyrite-rich vein, the alteration selvedge contains less carbonate, but more pyrite than away from the vein. Further away from the vein, pseudomorphs after feldspar are dominated by carbonate and clay. The pyrite-rich vein also contains quartz and carbonate and traces of chalcopyrite, sphalerite, tetrahedrite and galena. Later thin veins are carbonate-rich.
GCHR064 62.8 m TS

Summary: Porphyritic dacite (or microtonalite porphyry) originally containing phenocrysts of plagioclase, ferromagnesian phases, quartz and microphenocrysts of FeTi oxide in a fine grained quartzofeldspathic groundmass. The rock has undergone strong and pervasive hydrothermal alteration of propylitic type, with replacement of most phases (except quartz and some FeTi oxide) by quartz, carbonate, chlorite, sericite, clay and a little pyrite and leucoxene. The altered rock has been cut by a few veins containing quartz, carbonate, pyrite, chalcopryrite and a little chlorite.
Summary: Very strongly altered porphyritic dacite (or microtonalite porphyry) with local veining. The original rock contained scattered plagioclase, ferromagnesian and quartz phenocrysts, with a few microphenocrysts of FeTi oxide and apatite in a fine grained quartzofeldspathic groundmass. It probably underwent initial pervasive alteration with the formation of minor hydrothermal biotite at ferromagnesian sites, but subsequently this potassic alteration phase was overprinted by a pervasive propylitic alteration stage, causing extensive, strong replacement by sericite, carbonate, quartz, chlorite, clay, disseminated pyrite and a little chalcopyrite, hematite and rutile. The rock has been cut by a couple of sub-planar veins containing quartz and minor carbonate, pyrite, plus a little chalcopyrite, chlorite, magnetite and hematite. These veins are enveloped in strong phyllitic alteration selvages, with a quartz-sericite assemblage plus minor pyrite and a little chalcopyrite and carbonate.
Summary: Porphyritic dacite (or microtonalite porphyry) with crowded phenocryst texture with moderate to strong pervasive hydrothermal alteration. The rock has been cut by a prominent quartz-rich vein containing disseminated chalcopyrite and carbonate. The original rock contained abundant plagioclase phenocrysts and less common phenocrysts and microphenocrysts of quartz, ferromagnesian material and FeTi oxide, set in a subordinate amount of fine grained inequigranular quartzofeldspathic groundmass. The rock may have undergone initial alteration to albite and hydrothermal biotite, with a little chalcopyrite and magnetite being deposited, coeval with the emplacement of the quartz-chalcopyrite-carbonate vein. Subsequently, the rock underwent retrograde propylitic alteration, with replacement by chlorite, carbonate and sericite and emplacement of a few thin carbonate veins containing a little chalcopyrite.
Summary: Mostly hydrothermal vein infilling with minor retention of highly altered screens of host rock. It is likely that the host rock (presumably porphyritic dacite or similar, but no relict texture preserved) was initially intensely altered to assemblages ranging from hydrothermal biotite + quartz, with minor chalcopyrite and a little magnetite, to quartz-rich. There was invasion by a sheeted vein system showing crack-seal textures. The veins are dominated by quartz, with minor chalcopyrite and carbonate, and a little magnetite and trace bornite. Subsequent later veining has occurred with emplacement of a few carbonate + chalcopyrite veins. There was also retrograde alteration imposed on the remnant screens of host rock, with replacement of biotite by chlorite and a little carbonate and chalcopyrite, plus trace rutile.
Summary: Contact between fine grained porphyritic dacite and microtonalite porphyry, with both rock type displaying strong hydrothermal alteration and veining. It is possible that the dacite could be an enclave in, or a dyke in, the microtonalite porphyry, although the actual contact zone shows a thin strip of microbreccia, suggesting that it might be faulted. The dacite has scattered altered phenocrysts of plagioclase and ferromagnesian material (probably hornblende) and a few microphenocrysts of quartz and FeTi oxide in a very fine grained and slightly fluidal quartzofeldspathic groundmass. The microtonalite porphyry contains altered plagioclase and ferromagnesian phenocrysts and a few relict phenocrysts of quartz and FeTi oxide in an inequigranular, fine to medium grained quartzofeldspathic groundmass. Both rock types appear to have undergone early alteration, with local replacement by hydrothermal biotite and minor chalcopyrite and quartz. Albitisation of plagioclase could have occurred during this event, along with emplacement of a few veins of quartz, with aggregates of chalcopyrite, a little carbonate and trace pyrite and magnetite. Later, the sample underwent pervasive propylitic retrograde alteration with replacement by sericite, clay, chlorite and carbonate and the emplacement of several carbonate-rich veins.
Summary: Strongly porphyritic dacite, with relict quartz phenocrysts and pseudomorphs after former phenocrysts of plagioclase and ferromagnesian material in a very fine grained quartzofeldspathic groundmass. There has been very strong pervasive hydrothermal alteration of phyllic type imposed, with replacement of feldspar, ferromagnesian and groundmass components. The alteration assemblage is dominated by quartz, sericite and carbonate, with a little clay, pyrite and chlorite, and a few veins containing carbonate, minor pyrite and trace chalcopyrite.
GCHR107  216.8 m  PTS

Summary: Very strongly hydrothermally altered porphyritic intermediate to felsic igneous rock with abundant veining. The original rock may have contained phenocrysts of feldspar and ferromagnesian material in a fine grained quartzofeldspathic groundmass. There may have been initial alteration with replacement by biotite, quartz, chalcopyrite and pyrite, perhaps coeval with the emplacement of numerous sheeted veins containing quartz and minor chalcopyrite, pyrite and carbonate. Later retrograde alteration of propylitic type was imposed, causing replacement of all feldspar and ferromagnesian components by sericite, carbonate and chlorite. The later alteration was accompanied by the emplacement of several carbonate-rich veins.
Fig. 42: Portion of coarse chalcopyrite mass with a small composite inclusion of gold (pale yellow) and sphalerite (mid-grey). Gold grain is about 10 microns across. Plane polarised reflected light, field of view ~0.2 mm across.
Fig. 45: GCHR107/353.05 m: Sulphide composite aggregate associated with quartz (dark grey) in breccia matrix. The sulphides include pyrite (pale creamy), chalcopyrite (yellow), sphalerite (mid-grey) and galena (pale grey). Two grains of gold (pale yellow) are at a galena-sphalerite contact. Plane polarised reflected light, field of view ~0.2 mm across.
Copper Hill Geological/Mineral/Alteration DOMAINS

• **Mineralising Tonalite Porphyry - mineraliser domain**
  • Position – central top of area enclosed by pit shell, directly below the supergene zone.
  • Rock host – mainly MTP, some andesitic volcanics and TP dykes
  • Mineralisation style - dense to moderately dense veining – ‘M’ veins and ‘B’ veins + sulphide disseminations, mostly cpy.
  • Alteration- sericite-magnetite-chlorite (SCM) and sericite-chlorite-carbonate (SCC), typically.
  • M veins – quartz-mt-cpy-bn-(py) and gold
  • B veins – quartz – cpy – py- (bn, carbonate), characterised by a central zone of sulphide within the veins
  • Estimated volume of total ore tonnage– 31%

• **Unassigned LG primary**
  • Position – peripheral to the MTP mineraliser and Crowded Tonalite Porphyry/carapace domains.
  • Consistent low grade copper-gold mineralisation, vein hosted and disseminated,
  • within the pit shell but peripheral to the higher grade MTP-mineraliser domain.
  • Host rock not well defined but usually MTP or CTP/TP. Alteration – SCC, combinations of chlorite, sericite, carbonate, epidote, albite (propylitic)
  • Estimated volume of total ore tonnage– 31%
• **CTP/carapace domain**
  • Position – below the MTP-mineraliser domain
  • Rock host – mainly CTP, some MTP, TP dykes and andesitic volcanic
  • Mineralisation style - moderately dense to sparse veining – ‘B’ veins, ‘C’ veins and ‘D’ veins. Disseminated cpy and py also.
  • C veins – white to pink carbonate (Mn-bearing?) carbonate veins, commonly bearing some or all of cpy, sphal, gal, bn, py and gold. Base metal carbonate veins. These veins are commonly triangular in shape, as if infilling spaces formed by brecciation.
  • D veins – very late-stage veining – calcite, siderite or laumontite (gypsum, anhydrite at depth). These are unmineralised.
  • Estimated volume of total ore tonnage – 20%

• **Argillic domain**
  • Position – near-surface on the western side of the deposit, and in small patches in the Unassigned LG domain.
  • The least well defined zone in a sparsely drill-tested part of the deposit.
  • Rock host – Undifferentiated tonalite porphyry, CTP, MTP.
  • Mineralisation style – mainly disseminated py and cpy with some B vein hosted mineralisation.
  • This zone is characterised by its alteration style – white clay – sericite – minor silicification patches and chlorite, bordering on phyllic alteration.
  • Estimated volume of total ore tonnage – 6%
• **Mineralised breccia domain**
  
  To date, only intersected at Wattle Hill. Estimated volume of total ore tonnage ~1%.

• **Mixed tonalite porphyry/andesitic volcanic domain**
  
  Position – north-western part of the deposit. A discontinuous domain from 5200N to 6200N (local grid). Typified by mineralisation in GCHR298 and 319, where many small intrusions of tonalite are present in andesitic volcanic host rocks. This domain includes contact zone hydrothermally/magmatically brecciated andesite with tonalite porphyry clasts.
  
  The mineralisation is ‘B’, ‘C’ and ‘D’ vein and disseminated pyrite and chalcopyrite. The alteration is variable reddening-ser-si-carb-chl.
  
  Estimated volume of total ore tonnage = 8%

• **Mineralised waste**
  
  Samples of core judged to be below ore grade.

• **Barren intrusions/ QTP**
  
  Very barren, late, unaltered quartz tonalite porphyry dykes/intrusions. Average copper grade – 60ppm, average gold grade - <0.01g/t. This type of intrusion produces high grade gold and copper mineralisation in host rock around its contacts, probably by remobilisation into quartz veins.

• **Barren Zone/low-grade core**
  
  The ‘Barren Zone is a poorly drill-defined zone in the south-eastern part of the Copper Hill area. The gold and copper grades are sub-ore but above background levels, making it more mineralised than the Barren intrusion/QTP domain. The host rock is probably Crowded Tonalite Porphyry.
COPPER HILL DRILLING 2010 and into 2011

NEW ZONES

Buckley’s Hill Extensions & Wattle Hill Infill & Deeps
COPPER HILL DRILLING 2010 and into 2011
Buckley’s Hill Extensions
+200m wide near surface
+480m wide at depth
Drill intervals of:
486m @ 0.33% Cu
283m @ 0.23% Cu
with
66m @ 0.6% Cu
108m @ 0.43% Cu
+ gold credits
OPEN ALONG STRIKE & DEPTH
Buckley’s Hill, Section 6150N

• Big & expanding zone indicated

• Copper and gold grades remain elevated and above average.

• Substantial extensions indicated along strike to the northwest

• Step-out core drilling to begin immediately.

• Cross-sections both north and south of the 6150N section are not drilled at depth.

• Sizeable increase in the resource if similar mineralization can be drilled on the 6100N and 6050N sections, as the 6000N section also provides strong encouragement.

• Strong vector to significant higher grade mineralisation at depth These will all contribute significantly to the next resource estimate.
COPPER HILL
DRILLING 2010
and into 2011

NEW ZONES
Wattle Hill Infill & Deeps

73m @ 0.45% Cu, 0.42g/t Au
85m @ 0.39% Cu, 0.82g/t Au
101m @ 0.21% Cu
26m @ 0.5g/t Au
+ High grade NW plunging zone carrying
  3m @ 2.48% Cu
  8m @ 3.72% Cu
Oxide Resource Drilling  Gold grade  g/t x thickness contours
Oxide Resource Drilling  Copper grade  % x thickness contours
Copper Hill Mine - Critical Issues

- Preliminary open pit, mine infrastructure, ROM pad, waste dump, and tailings dam designs in progress
- Metallurgy/Processing test-work continuing

Under consideration:
- Capex & Financing
- Property purchases
- Water entitlements
- Regulatory approvals
Copper Hill – a low grade copper-gold porphyry deposit

ASX- GCR