

Potential and realizable ores from the Great Orme Mines

	Main/Minor ore minerals	Trace minerals	Tonnage, Grade, Continuity	Beneficiation and results	Metals in smelter charge
Bronze Age Ores					
1a copper veins 1b copper-vugh infilling	Chalcopyrite, malachite, copper-bearing limonite. Coarse-grain size. Few intergrowths	Copper Sulphide - digenite, djurleite, covellite, spionkopite, Copper Oxides - Cuprite, tenorite. Native Copper – Sphalerite, manganese oxides.	High tonnage, continuous. Approx.10% Cu metal. High tonnage, discontinuous. 10% Cu metal or less.	High grade chalcopyrite - malachite $\pm$ Cu bearing limonite concentrate by hand-cobbing.	Cu, Fe, trace Ni, Ag, Mn.
By product - Bronze Age Ores?					
2a Copper Ddu	Amorphous iron - copper bearing oxides/hydroxides. Minor malachite. Powdery	None	Tonnes, locally discontinuous. <5% Cu metal?	Beneficiation not possible.	Fe, Cu, trace Co, Mn, Ni As.
2b Azurite-shales	Azurite nodules <1cm, minor malachite.	Chalcopyrite, Pyrite.	Very local. Continuous. <2% Cu.	High grade Azurite concentrate.	Cu, trace Fe.
Non copper ore assemblages					
3a Polymetallic disseminated sulphides.	Chalcopyrite, galena, siegenite, pyrite, marcasite, Fine-grained, complex intergrown sulphides.	Cobaltite/gersdorffite malachite, azurite, tennantite, sphalerite.	Very little? No <i>in situ</i> ore seen. <5% Cu.	Fine-grained separate copper concentrate not possible.	Fe, Cu, Co, Pb, trace Ni, Zn, As.
3b Galena veins.	Galena, minor chalcopyrite. Coarse-grained galena.	Malachite, nickeliferous pyrite, marcasite, millerite, sphalerite.	Little tonnage. Continuous but localized. <1% Cu metal.	Lead concentrate by hand cobbing. Copper concentrate not possible.	Pb, Cu, Fe, trace Ni, Co, Ag, Zn.