

3. Mineragraphy of Zn-Pb sulphide mineralisation intersected in diamond drill core from near the Chester mine, western Tasmania.

P.L.F. Collins

Exploration by Comstaff Pty Ltd in the Chester-Pinnacles area of western Tasmania included several diamond drill holes in the vicinity of the Chester mine, on the steep eastern slopes of Mt Kershaw. During this drilling programme one of the drill holes (DDH CP3) intersected approximately 2 m of Zn-Pb sulphide mineralisation, from which eight polished sections were prepared for mineragraphic investigation to determine whether this mineralisation could be genetically related to the massive pyrite mineralisation at the Chester mine.

The assistance of D.B. Orr, Comstaff senior geologist, in making the drill core available is gratefully acknowledged; and G.B. Everard, Department of Mines mineralogist and petrologist, described the host rocks.

GEOLOGY

The mineralisation at the Chester mine occurs within an altered rhyolitic-dacitic volcanic sequence with a regional N-S strike, and consists predominantly of massive, fine-grained pyrite with occasional aggregates of fine-grained sphalerite and traces of galena and chalcopyrite. The pyrite is often thinly interbedded with chert, which together with small-scale folding of the chert-pyrite beds and occasional steeply dipping beds of pyrite indicate a pre-deformational, syngenetic origin for the mineralisation.

DDH CP3 was collared near the South Chester prospect [CP783804], approximately 500 m SSW of the Chester mine, and was drilled due east at a low angle, so that the drill hole roughly parallels the surface topography. The mineralised intersection is reported to be approximately 600 m, on strike, south of the Chester mine, and to contain 22.3% Zn, 5.77% Pb and 65.4 g/t Ag over an interval of 3.4 m from 516.5 m to 519.9 m (Keane and Orr, 1974). A brief description of the core over the mineralised interval is given below.

Depth (m)	Description
? -516.75	'74-409 (516.4 m). A fine-grained, sheared, leucocratic rock with grains of quartz up to one millimetre across, disseminated crystals and aggregates of pyrite and chalcopyrite, and galena and minor sphalerite concentrated in small shear planes. In thin section the rock consists of a fine-grained matrix of sericite and quartz with strained, irregularly shaped quartz grains and quartz aggregates averaging 0.3 mm across. Occasionally quartz grains show euhedral outlines or parts of euhedral crystals but within these crystal outlines are anhedral quartz grains and sericite. The euhedral outlines are sometimes lines of inclusions in a quartz crystal; or the outlines of feldspar crystals, although the original material is entirely altered to sericite. Anastomosing fine veinlets of quartz are common. Originally a crystalline quartzo-feldspathic rock, which was partially altered, recrystallised and remobilised before mineralisation, it is now described as a sheared and altered quartz porphyry.' (G.B.E.)
516.75-517.58	Sphalerite, pyrite, galena and chalcopyrite in veins up to 30 mm wide filling fractures in a quartz-sericite schist (74-411). Approximately 50% of the core consists of sulphides.

Depth (m)	Description
517.58-518.73	'74-411 (517.2 m). A fine-grained granular, structureless, leucocratic rock with disseminated crystals and aggregates of galena, chalcopyrite and pyrite. In thin section the rock has a sericitic matrix containing minute grains and granular mosaics of unevenly extinguishing quartz, frequently showing lines of inclusions and peripheral regrowth. Others show angular outlines and recrystallisation. The rock has a granular structure which cuts across the mineral distribution; shearing is evident, and some recrystallisation of sericite has occurred.' (G.B.E.)
518.73- ?	'74-418 (518.8 m). A very fine-grained leucocratic rock with disseminated crystals of pyrite and veinlets of galena. In thin section the rock consists of generally equidimensional quartz grains in a sericitic matrix. The mineral distribution is uneven and the various grains show strain, fracture and recrystallisation. Pyrite crystals of similar dimensions to the quartz grains are numerous and shearing is indicated.' (G.B.E.)

The western contact between the vein-type mineralisation in quartz-sericite schist and the quartz porphyry with disseminated sulphides is fairly distinct although veinlets of galena and sphalerite extend into the quartz porphyry. At 518.73 m there is a very distinct eastern contact between the sulphide mineralisation and the quartz-sericite schist although the core at the actual contact is broken, but on the two adjoining faces there is evidence of shearing.

MINERAGRAPHY

The following minerals were identified in polished sections of the mineralisation: sphalerite, pyrite, galena, quartz and chalcopyrite. Myrmekitic native silver(?) was recognised in 74-415 (518.3 m), occurring in quartz as grains up to 0.2 mm across; and minor, intergranular, anhedral loellingite(?), 0.05 mm across, was recognised in 74-412 (517.9 m).

Although it was not possible to distinguish a paragenetic sequence, some of the pyrite and quartz may represent an early stage of mineralisation followed by sphalerite, galena, pyrite, chalcopyrite, loellingite(?), silver(?) and quartz.

Pyrite generally occurs as discrete euhedral grains, up to 1.5 mm across, containing minute inclusions of sphalerite, galena and quartz. Embayment of the pyrite by sphalerite is common; often destroying the original euhedral outline of much of the pyrite. In 74-410 (516.8 m) broken pyrite grains are healed with sphalerite and galena; and discontinuous bands or lenses of pyrite and quartz with intergranular sphalerite and galena, 1-1.5 mm wide and 2.5-3.5 mm apart, occur in 74-415.

Sphalerite and galena exhibit mutual boundaries intergrowth, but on etching with concentrated H_2SO_4 , the galena and pyrite appear to be intergranular to the sphalerite, which generally occurs as anhedral grains 0.2-0.3 mm across, although up to 15 mm across in 74-413 (518.0 m), with mutual boundary junctions approaching that of an annealing texture.

Randomly orientated and often bent twin lamellae within the sphalerite (e.g. 74-416, 518.5 m) and curved trains of triangular cleavage pits in some of the galena (e.g. 74-414, 518.1 m), together with the annealed texture of the sphalerite and broken pyrite grains, indicate mild post-mineralisation deformation.

Chalcopyrite occurs only at the margins of the mineralisation as discrete intergranular grains up to 0.01 mm (74-410, 516.8 m; 74-417, 518.7 m), or as very fine blebs exsolved out of the sphalerite in either random arrangement or along distinct lines (74-410).

The mineralisation consists dominantly of sphalerite, ranging from 25-95%, with pyrite and galena in approximately equal proportions and ranging from 2-20%. The host rocks contain up to 10% sulphides (galena 4%, pyrite 3%, sphalerite 2%, chalcopyrite 1%) occurring as either discrete anhedral grains or as irregular aggregates accumulated along microfractures in the schist (74-411, 517.2 m). Most of the disseminated pyrite in the host rock occurs as intergranular subhedral grains up to 0.1 mm across and appears to be syngenetic with the original rock.

DISCUSSION AND CONCLUSIONS

The mineralisation intersected in DDH CP3 is characterised by a dominance of medium- to coarse-grained sphalerite with intergranular galena, pyrite and minor chalcopyrite; a very distinct eastern contact; narrow fracture-filling veinlets at the western contact; micro-veins of sulphides in the host quartz porphyry to the west and quartz-sericite schist to the east of the mineralised intersection; and an absence of primary banding of the sulphides - all of which suggest the mineralisation is probably a fracture-filling deposit. Also, the mineralisation is apparently later than the alteration and deformation of the host rocks, although it was subsequently subjected to mild deformation.

Reid (1918) describes several old prospects along the Pieman River south-east of the Chester mine, located on narrow fracture-filling veins of sphalerite, galena and pyrite striking approximately E-W and dipping steeply to the south, and occurring within quartz-feldspar porphyry; to which the mineralisation intersected in DDH CP3 is probably similar. This suggestion is supported by the failure of diamond drill holes immediately north and south of DDH CP3, to intersect any further mineralisation (D.B. Orr, pers. comm.).

In conclusion, the Zn-Pb sulphide mineralisation intersected in DDH CP3 is probably an E-W striking fracture-filling vein with an actual thickness much less than the apparent 2 m intersected in the drill hole; and therefore is not genetically related to the massive pyrite mineralisation at the Chester mine.

REFERENCES

- KEANE, E.T.; ORR, D.B. 1974. Report to the Department of Mines, Tasmania, for the month of May 1974, Exploration Licence 5/63 and 1/68. Unpubl. Rep.Comstaff Pty Ltd.
- REID, A.M. 1918. The North Pieman, Huskisson, and Sterling Valley mining fields. *Bull.geol.Surv.Tasm.* 28.

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