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COMMENTS ON THE SIGNIFICANCE OF

DIAMOND DRILL HOLE SMD044

at the

STAVELY PORPHYRY Cu-Au PROJECT,

WESTERN VICTORIA, AUSTRALIA

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SUMMARY

Significant bornite-chalcocite mineralisation has recently been intercepted from 890-928.3 meters by diamond drill hole SMD044 (38.3m at 1.59% Cu, 0.27g/t Au and 8g/t Ag) meters at Thursdays Gossan, in the northern portion of the much larger Victor zoned hydrothermal alteration. This drill intercept is hosted within the major NS trending steep west dipping Thursdays Gossan Fault which has been traced laterally with drill intercepts for some 750 metres and remains open to the south. The copper mineralisation overprints earlier pyrite D veins, which are well developed throughout the recent Thursdays Gossan drill core, with a paragenetic sequence of chalcopyrite -> bornite -> chalcocite -> tennantite-tetrahedrite, typical for fluid evolution of a cooling magmatic hydrothermal fluid. The Magma vein adjacent to the Resolution porphyry Cu, Arizona, is described (Ransome, 1912) with a similar pyrite-> chalcopyrite -> bornite -> chalcocite paragenetic sequence. Although phyllic alteration, which dominates in the SMD044 drill intercept, relates to the early D vein, continued movement on the Thursdays Gossan Fault as well as late collapse of anhydrite-sericite, some relict wall rock K-feldspar may have been associated with the Cu mineralisation. Other nearby drill intercepts of Cu-sulphide overprints upon the pyrite D veins suggest a significant Cu source may be present in this vicinity.

A splay fault defined in drill intercepts on the eastern side of the Thursdays Gossan Fault also hosts Cu sulphide mineralisation in many drill intercepts, including at 583-593 metres in DDH SMD044 (10m at 2.43% Cu, 0.30g/t Au and 11g/t Ag), as a several metre wide zone of pyrite-chalcopyrite and later bornite with an anhydrite overprint in association with prograde wall rock alteration. Additional splay faults might emerge with continued analysis of known and future Cu drill intercepts.

The intersections of splay faults with linear arc-parallel structures, developed as the deeper portions of dilatant negative flower structures, represent ideal settings for the localisation of vertically attenuated porphyry Cu deposits. Consequently, a porphyry Cu target lies in such a setting at depth below the vicinity of DDHs SMD029W1 and 004. This setting for a porphyry target is also supported by a rough zonation in copper mineralogy outwards from any speculated porphyry, as chalcopyrite -> bornite -> + chalcocite, wall rock hosted veins in the bottom on drill hole SMD029W1 and the numerous instances of Cu-sulphide overprints on pyrite D veins in this vicinity (above). Most enargite is related to separate high sulphidation epithermal mineralisation close to the contact fault between the volcanosedimentary sequence and ultramafic rocks to the east with rare vughy silica, alunite and pyrophyllite wall rock alteration.

Analysis of paragenetic sequence of events suggests 2 separate magmatic sources, possibly porphyry Cu bodies, might be present, although possibly overprinted in the same location perhaps with some juxtaposition. The earlier pyrite D veins with phyllic wall rock alteration selvages are typical of those which generally represent the final event of the porphyry vein cycle. At Thursdays Gossan these late-stage veins are overprinted by copper lode mineralisation with prograde hydrothermal alteration which might be expected to develop early in the alteration cycle, and may be related to the lithologically controlled (manto style) haematite-magnetic alteration in DDH SD044, 584-697 m.

These 2 blind porphyry targets are rated with a priority A for further investigation.

The potential for copper lode mineralisation within the Thursdays Gossan Fault and adjacent splay faults should also be investigated with a priority A/B.

A recent intercept of chalcopyrite-bornite within epidote altered dacite in a drill test at the 5 km long Mt Stavely soil anomaly requires follow up with a priority B.

INTRODUCITON

At the request of Chris Cairns, in February 2019, 2 days were spent at the Stavely Project in Western Victoria, Australia, in order to consider the significance of bornite-chalcocite mineralisation recently intersected in diamond drill hole SMD044, and discuss other aspects exploration carried out since the author's last visit in September 2018 (Corbett, 2018b). The assistance in this work is greatly appreciated of the Stavely team: Chris Cairns, Hamish Forgan, Stephen Johnson, Michael Agnew and Benton Nijhof.

Priority

Exploration projects are rated with priorities to proceed with the planned work program to take them to the next decision point. Any such a grading might include a number of projects at widely differing stages of evaluation, some with substantial data bases, while others might be unexplored, but may display considerable untested potential. Priorities are based upon the data to hand at the time of inspection, and are subject to change as increased exploration provides improved and additional data. Projects are categorised as:
A – Of highest interest such that the proposed exploration program should be carried out immediately. However, early stage projects with untested potential might be rapidly down graded from this stage by completion of the planned work program.
B – Of some interest and should be subject to further work if funds are available, often with smaller components of continued exploration expenditure than higher priority targets.
C – Of only little interest and subject to further work at a low priority if funds are available, but not to be relinquished at this stage.
D – Of no further interest and can be offered for joint venture or relinquished.

GEOLOGICAL SETTING

The Stavely porphyry Cu-Au project lies within a region of porphyry Cu manifestations developed over a 10 km strike portion of the NNW trending Cambrian age Stavely magmatic arc in Western Victoria (Cairns et al., 2015). The up to 5 km wide Stavely Arc volcanosedimentary package is bounded to the east by the structural contact with ultramafic rocks (figure 1) and undergone extensive post-mineral deformation. Typical porphyry Cu style zoned hydrothermal alteration defined over a 4 km strike extent at the speculated Victor porphyry, and grades inward from propylitic alteration to phyllic-argillic and a core of advanced argillic alteration interpreted by Spencer (1996). Given that the 'advanced argillic' zone described by Spencer is dominated by the clay minerals kaolinite and dickite, and that other characteristic minerals such as alunite and pyrophyllite are not noted, this zone may be better described as intense intermediate argillic alteration in the Spencer (1996) terminology, or phyllic-argillic in Corbett (2008 & 2017). A leached cap which has formed by weathering of the strongly pyritic interpreted advanced argillic alteration is further interpreted by Stavely Minerals geologists to overprint and obscure non-outcropping potassic alteration and porphyry B veins.

The Thursdays Gossan region at the north portion of the Victor porphyry zoned hydrothermal alteration system is named for boulders of ferruginous gossan in wheat fields considered to result from the weathering of distinctive massive pyrite D veins recognised in recent drilling and discussed below (photos 1 & 2). Although early exploration was focused within the marginal phyllic-propylitic altered portion of the Victor porphyry zoned hydrothermal alteration, the recent interpretation (Cairns pers. commun), that the chalcocite blanket might be derived from weathering Cu-bearing D veins, has directed exploration further north at Thursdays Gossan. These veins have therefore been used as vectors to focus exploration seeking a porphyry source in that area.

Recent exploration by Stavely Minerals in the vicinity of Thursdays Gossan has more clearly defined the geology and structure west of the steep west dipping, but stepped, contact with the ultramafic rocks (figure 1). The andesitic volcano-sedimentary rock package is transected by two groups of major faults which trend roughly NS-NNW and display either steep or flat dips to west. Varied senses of complex overprinting pre-, syn- and post-mineral polyphasal movement are interpreted for both sets of structures, and so it is difficult to discern cross-cutting relationships between them. The most prominent NS fault identified by Stavely Minerals on many cross-sections in the recent drill program is herein termed the Thursdays Gossan Fault.

The Thursdays Gossan Fault localises recent drill intercept (DDH SMD044, at 890-928.3 m) with significant bornite-chalcocite mineralisation which now provides a substantial contribution to the Stavely Exploration Model.

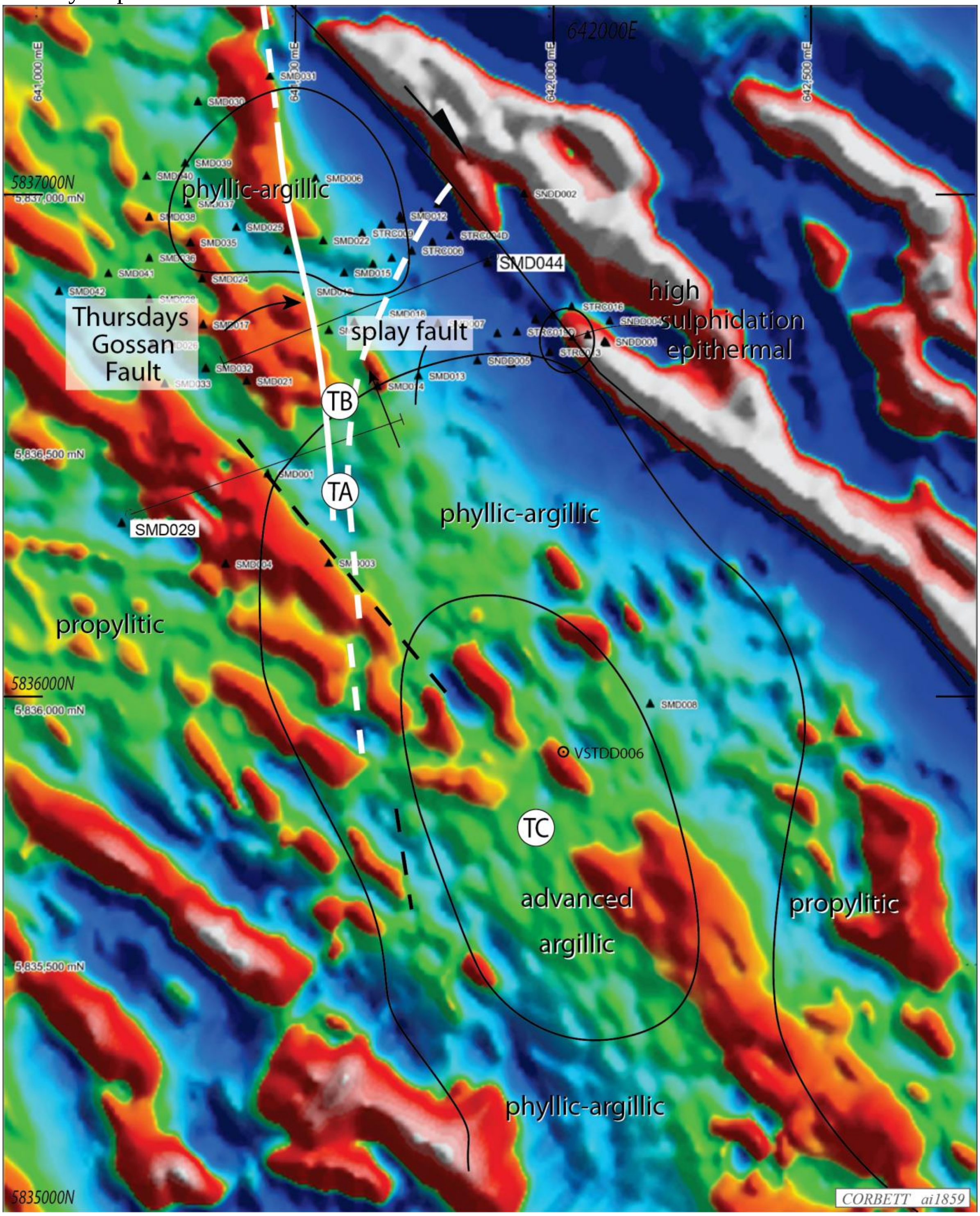

Figure 1 Magnetic data overlain by some elements of Stavely geology such as the Thursdays Gossan adjacent splay faults and also the contact between the Stavely volcosedimentary sequence and adjacent ultramafic rocks to the east. Hydrothermal alteration is from Spencer (1996).

STRUCTURE

Continued exploration has further enhanced the understanding to the structural controls to mineralisation at Thursdays Gossan (figures 1 & 2). These data suggest this segment of the Stavely Magmatic Arc, which displays an overall NW-NNW (average 328°) trend, hosts the Thursdays Gossan Fault, now defined as a NS-NNW (average 353°) trending structure recognised in many drill intercepts over about a 750 m strike with a steep (85°) western dip. Copper Lode mineralisation has been intersected in association with the Thursdays Gossan Fault by DDH SMD044 890-928 m, (38.3m at 1.59% Cu, 0.27g/t Au and 8g/t Ag), although the true width of the intercept remains unknown.

Additional sulphide-bearing drill intercepts define a major curved splay fault, adjacent to the east of the Thursdays Gossan Fault, between it and the ultramafic contact fault. Further analysis of the known and future sulphide drill intercepts may define additional splay faults. Drill hole SMD044 hosts an intersection with the splay fault at 580-590 m (10m at 2.43% Cu, 0.30g/t Au and 11g/t Ag), as a several metre zone of pyrite, chalcopyrite and bornite with post-mineral anhydrite (photo 15). Such a splay fault could have developed as a fracture, and been dilated to host sulphides, as a result of a component of transient dextral movement on the major contact structure between the volcanic and ultramafic units (ultramafic contact fault) as well as dextral movement on the Thursdays Gossan Fault (figure 1). Consequently, both the Thursdays Gossan and splay faults would also have been dilated during this dextral movement as a host for epigenetic hydrothermal sulphides to form a copper lodes traced over several drill intercepts. The splay fault has been traced to a position close to the Thursdays Gossan Fault below the termination of DDH SMD029 (figure 2).

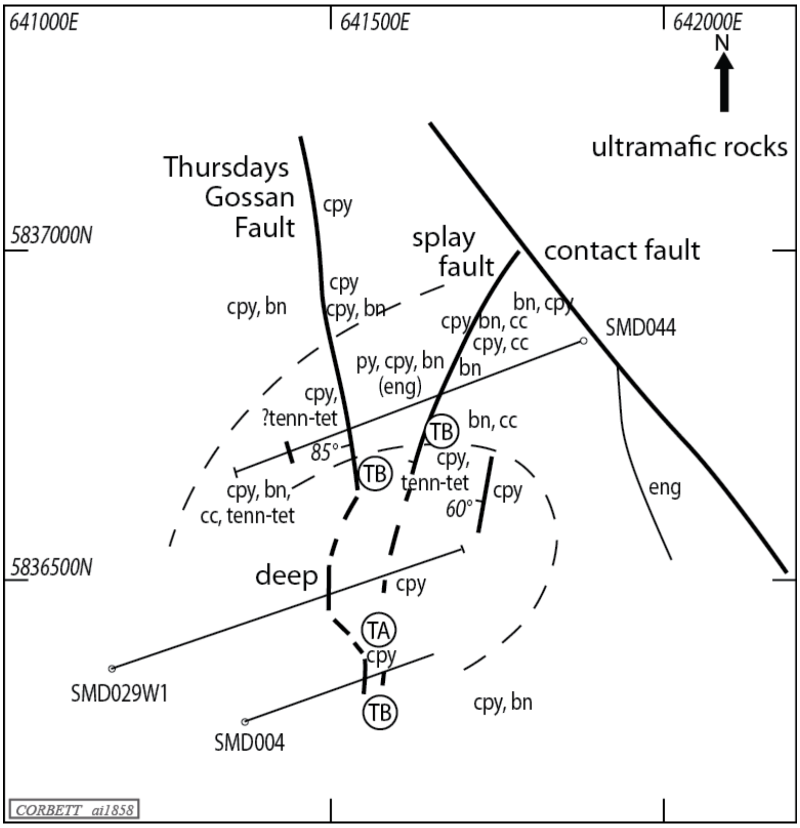

Figure 2 Elements of the Thursdays Gossan Fault – splay fault couple showing the targeted (TA) setting of possibly porphyry intrusion emplacement as well as Copper lode targets (TB). There is a zonation in Cu species around target TA, although most enargite is related to a different high sulphidation epithermal event localised close to the contact fault with the ultramafic rocks.

Splay faults, developed at the deepest level in dilatant negative flower structures (Corbett, 2017 and references therein) represent ideal settings for the localisation of porphyry Cu intrusions on linear arc-parallel structures, and host linked epithermal deposits within the dilatant splay environments, apparent at examples such as Far South East-Lepanto, Philippines; Chuquicamata, Chile; and Nena-Frieda, Papua New Guinea. The application of the splay fault model therefore provides a porphyry Cu-Au exploration target at depth in the vicinity of the termination of DDH SMD029, described as Target A below. This target may lie at the intersection of a cross-fault parallel to the contact fault between the Stavely volcanosedimentary sequence and the ultramafic sequence (figure 1).

HYDROTHERMAL ALTERATION

The model for hydrothermal alteration recognised in the recent Thursdays Gossan drill holes (Corbett 2018a & b) suggests overprinting alteration is discernible as early broad scale phyllic (silica-sericite-chlorite-pyrite) alteration capped by argillic alteration (clay-pyrite) which is locally overprinted by prograde propylitic alteration zoned from inner propylitic variably characterised by epidote, actinolite and magnetite, grading outwards to chlorite-carbonate dominated outer propylitic alteration. The broad early phyllic and later overprinting argillic alteration are interpreted to be related to the Victor porphyry to the south, whereas individual porphyry intrusions such as the quartz diorite porphyry (QDP) and their magmatic sources in the Thursdays Gossan area may represent the heat sources for the zoned prograde and localised retrograde alteration which overprint the earlier broad scale phyllic-argillic alteration event.

The Victor porphyry is interpreted to account for the 4 km long zoned porphyry style hydrothermal alteration (Spencer, 1996) characterised by propylitic grading inwards to phyllic-argillic (figure 1). A leached cap is interpreted to have been formed by reaction with wall rocks of acidic supergene ground waters formed by the weathering of pyrite-rich ‘advanced argillic alteration’ in the centre of the phyllic alteration. The interpretation by Stavely geologists that the supposed advanced argillic alteration overprints and obscures any zone of potassic of alteration, including porphyry B veins, expected to occur at the centre of the Victor zoned alteration system, implies any porphyry core would have undergone only minor erosion, and so a target may remain below the leached cap at depth. There remains a risk in the interpretation of the hypogene advanced argillic alteration, as many of the minerals upon which it might be defined such as alunite and kaolinite, could also form by supergene processes. Most porphyry Cu mineralisation displays a close association with potassic altered intrusions at the centre of zoned porphyry alteration systems, although this potassic alteration may be overprinted by later phyllic alteration. Drilling to date (VSTD004, VSTD006 and VSTD006W, all drilled vertically) in the centre of the zoned alteration system, all failed at ~320m down hole without penetrating the leached cap and so no potential chalcocite enrichment zone or potassic alteration have been encountered. Continued exploration needs to test the centre of the zoned alteration for a potentially mineralised potassic altered porphyry intrusion.

MINERALISATION

Recent mineralised drill intercepts facilitate a considerable advance of the Stavely Exploration Model to aid in the delineation of several exploration targets. Most quality porphyry Cu-Au deposits are characterised by multiple events of porphyry emplacement and associated mineralisation, and so attention should be paid at Stavely to delineation of interpreted, but possibly unseen, polyphasal intrusion events evidenced by associated veins or hydrothermal alteration.

Paragenetic sequence

Discussion with Stavely Minerals geologists and analysis of drill core from the recent drill program at Thursdays Gossan provides a tentative paragenetic sequence of events, which is here provided for modification as additional data comes to hand during continued exploration, as:

Emplacement of the main Victor porphyry and creation of the zoned hydrothermal alteration (Spencer, 1996) is considered, from dates on molybdenum-bearing quartz veins over a considerable strike distance, to have been initiated at about 510-500 m.y., in the mid to late Cambrian. Porphyry-style veins have been emplaced into the adjacent wall rocks and a halo of Mo and Zn anomalism is recognised surrounding the Victor porphyry, which is interpreted to cap a much larger magmatic source at depth. Exploration which to date has identified porphyry-related veins within propylitic-phyllic alteration, should seek to test any possible central potassic alteration.

The quartz diorite porphyry which represents one of the main and earliest intrusions at Thursdays Gossan, is dated at 498 and 496 $\pm$ 8 m.y. Stavely Minerals geologists suggest this intrusion may have been the source of laminated quartz-magnetite (M style) veins intersected in recent drilling. However, these veins at Stavely lack significant Cu-Au mineralisation, which in examples from elsewhere is typically introduced as bornite-chalcopyrite-pyrite after formation of the laminated quartz-magnetite veins (Corbett, 2018b).

Continued intrusion includes emplacement of a poorly mineralised microdiorite and an unusual microdiorite characterised by high P (to 3000 ppm) and Ti (to 1.2%). Aplite dykes are interpreted to represent the uppermost manifestations of more deeply buried intrusions and are associated with early stage A veins.

Continued vein development features several locally overprinting vein styles currently not directly related to any specific intrusion. Quartz-molybdenite veins cut by later D vein may relate to the Victor porphyry and larger batholitic source. Barren early A veins are reported to cut D veins while others are cut by D veins.

Several styles of veins included within the D vein classification of Gustafson and Hunt (1975) include:

Massive pyrite D veins are well distributed throughout the Thursdays Gossan drill core as essentially barren (unless overprinted by mineralisation) cross-cutting veins to several metres thick of commonly coarse grained massive pyrite with minor quartz and associated well developed sericite wall rock alteration selvages (photos 3-5). These veins are interpreted to represent the source for the boulders of ferruginous rock at Thursdays Gossan. Although the massive pyrite D veins have previously been described (Corbett 2018a & b) as well developed within the steep NS and flat west dipping faults, recent work has identified a south dipping vein trend.

High sulphidation epithermal Au-Ag veins are best developed close to the faulted contact between the Stavely Volcanics and the ultramafic unit to the east (figure 1) and characterised by the presence of vughy residual silica (photo 6) grading to alunite and more marginal pyrophyllite in characteristic advanced argillic alteration with pyrite-enargite ore minerals. Here, vughy residual silica is regarded as essential for any drill intercept to be classed as high sulphidation epithermal. Curiously, high sulphidation epithermal veins are recognised overprinting earlier low sulphidation veins in the same structures (Corbett, 2018a) and so, as recognised in many districts, could have developed late after uplift and erosion of the earlier porphyry mineralisation developed at a deeper crustal level. These epithermal veins are not currently considered as targets at Stavely.

Copper Lodes include many drill intercepts at Stavely characterised by mineralogies which include semi-massive bodies of lesser quartz with pyrite and copper minerals such as chalcopyrite, chalcocite, bornite or covellite with rare enargite. As suggested earlier (Corbett 2018b), hot near neutral porphyry fluids derived from the magmatic source rocks for porphyry Cu-A intrusions may evolve, during migration and result in the development of copper lodes within adjacent dilatant faults, and further evolve to deposit minerals typical of low pH and moderate temperature environments, in paragenetic sequences characterised by pyrite plus, chalcopyrite -> bornite -> chalcocite -> enargite. The latter enargite is typical of high sulphidation epithermal Au deposits, while bornite-chalcocite are recognised at deep levels in the transition from a porphyry environment. At any stage this fluid may become cooled and neutralised by wall rock reaction to deposit minerals such as tennantite-tetrahedrite and associated argillic alteration, either before or after reaching the high sulphidation state. Although there is a relationship between the copper lodes and deeper portions of high sulphidation epithermal deposits, the use of epithermal terminology should be avoided for the near-porphyry copper lodes in a porphyry exploration program. The avoidance of epithermal terminology is based upon the model that the mineralising fluid may have to travel some distance from the porphyry source in order to evolve sufficiently to form the low pH fluid responsible for development of high sulphidation epithermal alteration and mineralisation (Corbett and Leach, 1998, Corbett, 2008). Furthermore, the ‘copper-lode’ terminology better reflects a prograde mineralising event where the mineralising fluid has not migrated a great distance from the porphyry source.

The *copper lode intersected in DDH SMD044, 890-928.3 m* (38.3m at 1.59% Cu, 0.27g/t Au and 8g/t Ag) is recognised as the most significant copper intercept at Stavely to date. It lies within the major NS fault now termed the Thursdays Gossan Fault and displays a paragenetic sequence consistent with that described above as: pyrite -> chalcopyrite -> bornite -> chalcocite -> tennantite-tetrahedrite, which reflects the evolution of a cooling hydrothermal fluid in a near porphyry setting (photos 7-9). Copper mineralisation is dominated by bornite and lesser chalcocite while a thick quartz molybdenum vein is recognised at the western, deeper end of the intercept and copper mineralisation is cut by a post-mineral dacite dyke. This copper lode is taken to overprint earlier massive pyrite D vein mineralisation with associated wall rock sericite localised within and adjacent to the NS fault (photos 7-10). The pyrite -> chalcopyrite -> bornite -> chalcocite paragenetic sequence is also noted (Ransome, 1912) at the Magma vein adjacent to the blind Resolution wallrock porphyry, Arizona, USA.

Similarly, elsewhere in DDH SMD044, (347.8 m; photo 11 and 373.7 m; photo 12) chalcopyrite-bornite mineralisation cuts the massive pyrite D veins, which is also recognised in other drill holes in the vicinity of DDH SMD044 (DDH016,36.3m; photo 13: DDH028, 582.2 m; photo 14). These drill intercepts display the same paragenetic sequence of pyrite -> chalcopyrite -> bornite and provide evidence of a significant Cu source in the vicinity of Thursdays Gossan.

The splay fault drill intercept to the east of the Thursdays Gossan Fault (DDH SMD044, 583-593 metres - 10m at 2.43% Cu, 0.30g/t Au and 11g/t Ag) includes pyrite, chalcopyrite, bornite mineralisation which is cut by later anhydrite (photo 15) within a thick pyrite-chalcopyrite bearing, now dismembered, fault and associated with prograde chlorite-magnetite wall rock alteration. This structure may have acted as a feeder structure for the adjacent lithologically controlled (manto) mineralisation described below.

Chalcopyrite and later bornite within a Mg-rich basalt at SMD044 584-697 m, is hosted within fractures and breccias within prograde magnetite-haematite-chlorite alteration overprinted by abundant anhydrite, which in turn is locally brecciated and in-filled with specularite (photos 16 & 17). The Mg basalt is interpreted to have been competent and amenable to fracture formation and also Fe-rich, and so may have promoted the formation of Cu-Fe minerals. This drill intercept might therefore be classed as lithologically controlled mineralisation. The formation of Fe-sulphide minerals may have destabilised the hydrothermal complexes which transported Cu to promote the Cu deposition. This chalcopyrite-bornite mineralisation and associated prograde wall rock alteration are likened to G veins in the classification of Corbett (2019) as a style of prograde mineralisation and hydrothermal alteration formed within wall rocks outside the source intrusion early in the paragenetic sequence of porphyry formation. It would be interesting to compare this drill intercept to the “manto” mineralisation was mined adjacent to the Magma mine, at Resolution, Arizona if some description of that mineralisation can be found.

Anhydrite-sericite alteration overprints the prograde copper lodes as part of the drawdown collapse of retrograde fluids associated with the final shut down of the hydrothermal system.

Discussion

The complex paragenetic sequence at Thursday Gossan is consistent with a porphyry system characterised by a strong polyphasal intrusion emplacement, which might provide several events of mineralisation to facilitate the development of possibly economic higher Cu-Au grades. At Thursdays Gossan a paragenetic sequence currently suggests major intrusion-mineralisation events might occur as:

The large Victor porphyry no doubt accounts for the regional hydrothermal alteration and wall rock hosted porphyry-style veins responsible for halos of Mo and Zn anomalism, typical of many other porphyry deposits. Early exploration investigated Cu anomalism associated with chargeability anomalies in the phyllic-propylitic alteration. The presence of D veins and phyllic alteration recognised in early exploration data (Corbett, 2012) confirmed the exploration potential of the Stavely region. However, the central portion of the zoned hydrothermal alteration has not yet been properly drill prospected for buried potassic alteration with which most porphyry Cu mineralisation is recognised elsewhere.

The quartz diorite porphyry (QDP) has been suggested as the source for the laminated M and associated A veins which are cut by pyrite D veins at Thursdays Gossan. These intrusions may account for prograde alteration overprint upon earlier phyllic alteration derived from the Victor porphyry and display later retrograde sericite alteration. However, cross cutting magnetite veins within the QDP (photo 18) are indicative of another later intrusion emplacement.

The massive pyrite D veins are especially well developed in the Thursdays Gossan area and no doubt represent the sulphide-quartz which weathered to provide the boulders of Thursdays Gossan (photos 1-5). The Victor porphyry system would have to display a protracted history of activity with a focus moving to the northern margin in order to act as a source for these veins. Rather, no specific intrusion presently accounts for the development of these abundant veins. Furthermore, as D veins they should be developed late in the paragenetic sequence of vein development of the source porphyry intrusion, with sericite wall rock alteration selvages, but are cut by the copper lodes.

The copper lodes which overprint the pyrite D veins are associated with prograde wall rock hydrothermal alteration and so are expected to have developed early in the paragenetic sequence of the source intrusion, if they are derived from a porphyry Cu rather than the deeper magmatic source. That is, the pyrite D veins are expected to have developed at the end of an earlier porphyry Cu cycle (in Corbett, 2019) whereas the overprinting copper lodes appear to have developed at the beginning of the next cycle. No specific intrusion has yet been identified to account for the copper lode in DDH SMD044, or the many other copper lodes, including Cu sulphides which overprint the pyrite D veins, recognised at Thursdays Gossan (above).

Of great interest is that a tentative zonation is apparent in the copper lode Cu-sulphide mineralogy at Thursdays Gossan. At this stage this zonation is only considered in plan view (figure 2) but should be considered in 3 dimensions by the construction of long section projections along the major faults. Copper minerals with associated pyrite, show a rough zonation at shallow levels grading outwards from an interpreted source as: chalcopyrite -> bornite -> bornite-chalcocite –> tennantite-tetrahedrite or chalcocite with rare enargite, depending upon the pH of the fluid as it evolves away from the porphyry source. A concentric character to this zonation vectors towards a possible target in the vicinity of below the bottom of DDHs SMD029W and SMD004 and is potentially localised on the intersection of the Thursdays Gossan Fault and the Splay Fault. Most enargite is associated with high sulphidation epithermal Au mineralisation localised close to the contact fault between the Stavely volcanosedimentary rocks and the ultramafic rocks to the east (figure 2).

The bottom of DDH SMD029W hosts many features that might be expected within the wall rocks in the vicinity of a buried porphyry Cu-Au source (photos 19-22) such as:

- Irregular quartz veins or silicification with magnetite-chalcopyrite.
- Chalcopyrite on fractures and reactivated bedding planes,
- Wall rock K-feldspar-magnetite-actinolite potassic alteration,
- Magnetite replacement of favourable beds in the volcanosedimentary sequence.

CONCUSIONS

Buried blind porphyry Cu-Au mineralisation at Thursdays Gossan may represent the two separate speculated magma sources, although possibly overprinted, which are required to account for two major vein styles as:

- The thick massive pyrite D veins with sericite wall rock selvages are correlated with typical Gustafson and Hunt (1975) style D veins developed within the wall rocks late in a porphyry paragenetic sequence marginal to source porphyry deposits.
- The copper lodes cut the pyrite D veins yet appear to be associated with prograde wall rock alteration (photos 7 & 15) and so have developed in a later porphyry cycle, if they are related to a porphyry rather than a deeper magmatic source at depth.

The Cu mineralisation hosted by the Mg basalt mineralisation in DDH SMD044 is of a prograde style likened to early wall rock G veins recognised elsewhere (Copper Hill, NSW), and might be regarded as a manto in American terminology.

Copper lode mineralisation on both the Thursday’s Gossan Fault and the Splay Fault appear to be cogenetic and, as is the case in porphyry districts elsewhere, the convergence of these structures represents an ideal location for emplacement of the source porphyry intrusion.

A additional target for porphyry Cu mineralisation associated with potassic alteration at the centre of the Victor zoned hydrothermal alteration remains to be properly tested. The existing drill holes failed in the leached cap at 300 m depth.

Targets

Target A represents a blind porphyry Cu-Au target, with a priority A, at the centre of the copper lode Cu-sulphide zonation and the position where the splay fault bifurcates from the NS Thursdays Gossan Fault below the termination of DDHs SMD029W and SMD004 (figure 2). Some features in drill hole SMD029 support the possibility that a porphyry might occur at depth.

Target B occurs as fault controlled copper lode mineralisation, such as that intersected at DDH SMD044, 890-928.3 m, in the deeper level portion of the NS Thursdays Gossan Fault. This mineralisation is open to the south and also lies in the adjacent splay fault, while further work may identify additional splay faults in association with the many known Cu-sulphide intersections. This target is provided with a priority A/B.

Target C represents a speculated porphyry Cu associated with potassic alteration interpreted by Stavely Minerals geologists to lie below the leached cap at the so called ‘advanced argillic alteration' in the centre the Victor Porphyry zoned hydrothermal alteration system. It is rated with a priority A for further work.

Target D is represented by the Mt Stavely 5 km long soil anomaly where a recent drill test has identified chalcopyrite rimmed by bornite within a dacite with local epidote alteration (photo 23) in drill hole MSD001. This target is provided with a priority B.

RECOMMENDATIONS

Four targets are suggested above for a drill test.

Continued analysis at Thursdays Gossan could include:

- Further refinement of the paragenetic sequence should test the conclusions drawn herein.
- Development of a vein x metre distribution map and long sections for the thick pyrite D veins in the Thursdays Gossan area to determine whether these veins might vector towards a target.
- Tabulate the copper lode intercepts with estimates of: mineralogy, along with down hole and possible true width metal grades and investigate whether any of the known intercepts might contribute towards the identification of additional splay faults.
- Improve upon the map of Cu sulphide species distribution in figure 2 and compile long sections to provide a 3 dimensional view of Cu mineral zonation.

Stavely is a porphyry exploration project and so should avoid any confusion with epithermal regimes created by use of the high sulphidation terminology for the copper lodes.

Further work might check of whether relict prograde hydrothermal alteration associated with the SMD044, 890-928.3 m intercept copper lode remains after retrograde phyllic alteration, as suggested by the pink colour in photo 7. The entire 38 m interval should also be inspected for the presence of syn-mineral dykes which could relate to the source of mineralisation.

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PHOTOS

Photo 1 Boulders of gossan at the margin of a wheat field at Thursdays Gossan.

Photo 2 Detail of the gossan exposure above, interpreted to have been derived form the weathering of the massive pyrite veins with minor quartz shown in photos 3 and 4.

Photo 3 A several metre wide drill intercept of massive pyrite with sericite altered wall rock, DDH SMD044, 324.9 m.

Photo 4 Close up of the massive pyrite in photo 3 showing minor quartz, DDH SMD044, 324.9 m.

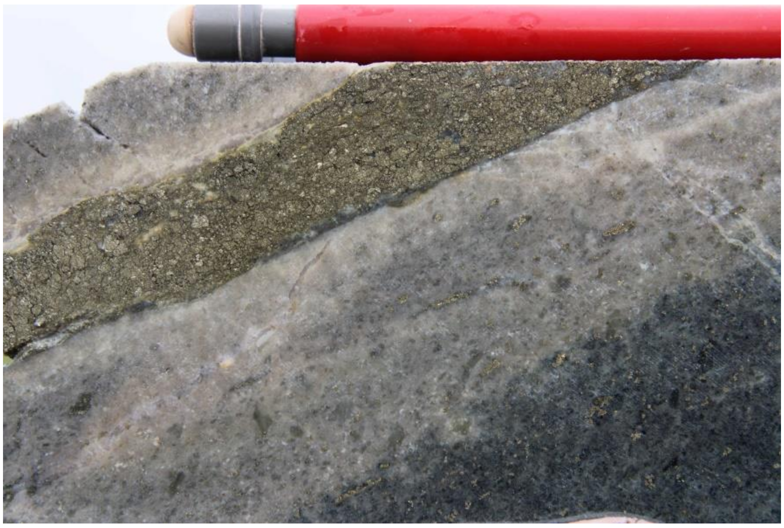


Photo 5 Massive pyrite D vein with selvage wall rock alteration, DDH SMD013, 302 m.

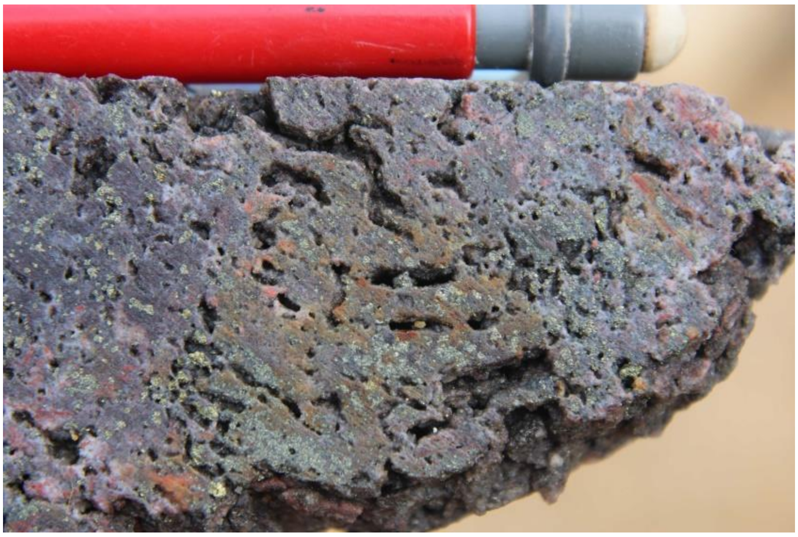


Photo 6 Vughy residual silica formed as part of the advanced argillic alteration associated with an enargite-pyrite bearing D vein, DDH SNDD1, 100.2 m.

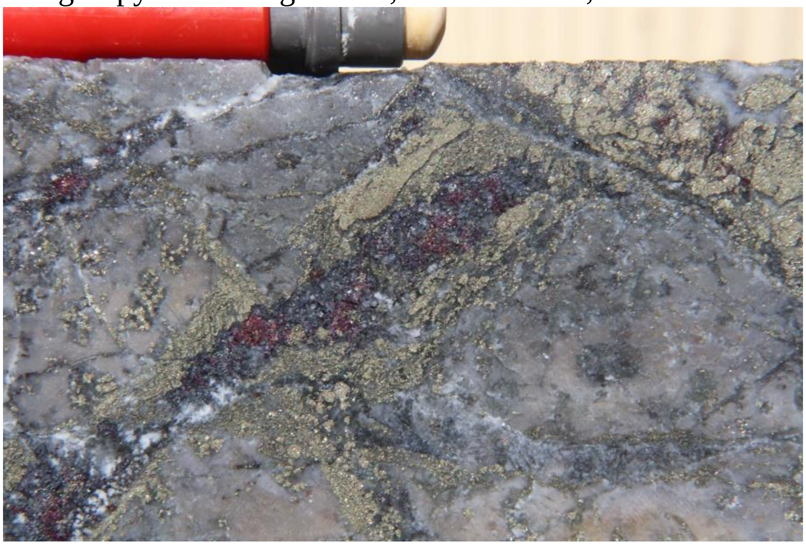


Photo 7 Massive pyrite cut by bornite overprinted by chalcocite, with a faint pink coloured wall rock possibly indicative of relict K-feldspar, DDH SMD044, 924.2 m.

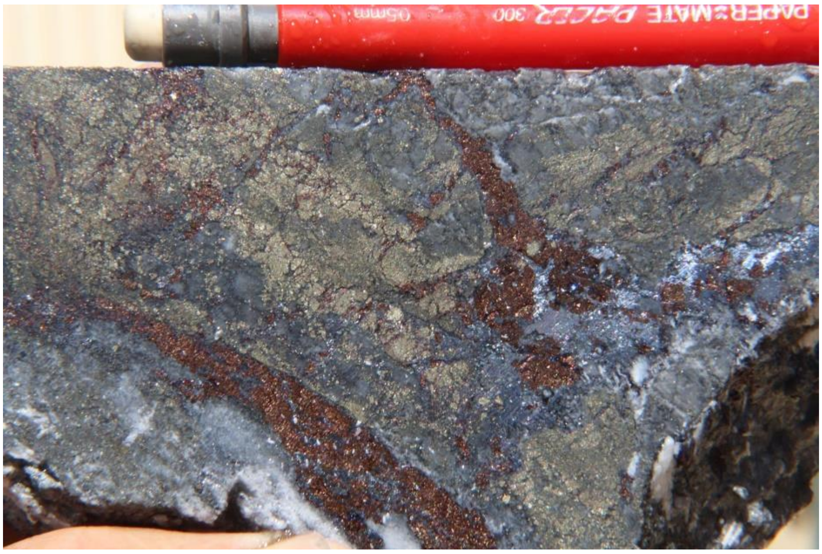


Photo 8 Massive pyrite cut by bornite grading to later chalcocite, DDH44, 924.4 m.

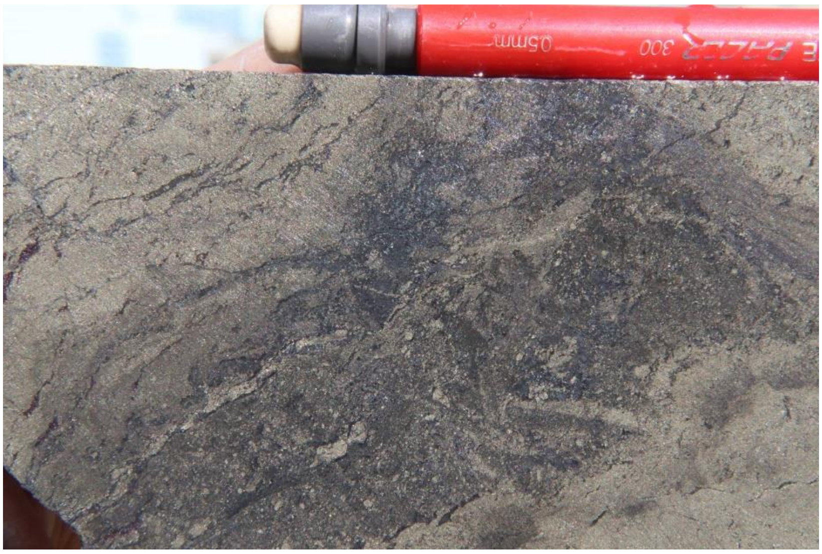


Photo 9 Massive pyrite cut by tennantite-tetrahedrite, DDH SMD044, 910 m.

Photo 10 Massive pyrite D vein within sericite altered wall rock which has been dilated adn in-filled with quartz, bornite and chalcocite, DDH SMD044, 912.9 m.

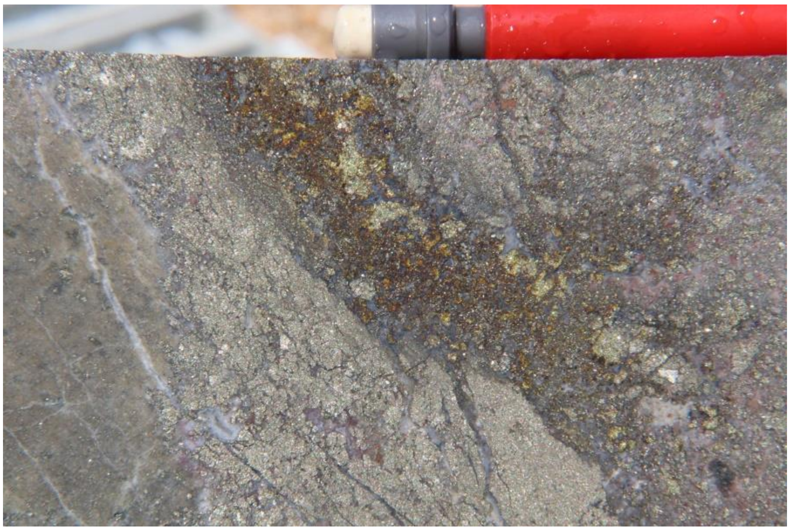


Photo 11 Typical massive pyrite D vein cut by chalcopyrite and possible hypogene bornite, DDH SMD044, 347.8 m.

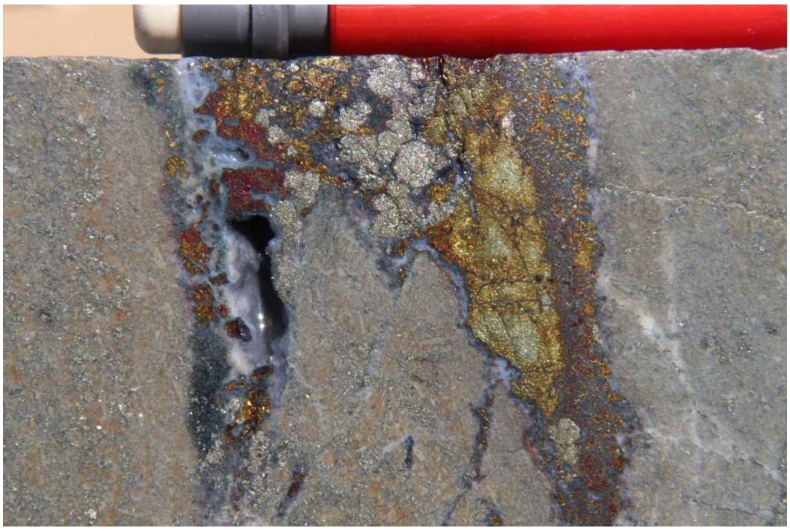


Photo 12 Massive pyrite D vein cut by chalcopyrite-bornite, DDH SMD044, 373.7 m.

Photo 13 Massive pyrite D vein cut by chalcopyrite followed by bornite, DDH SMD016, 336.3 m.

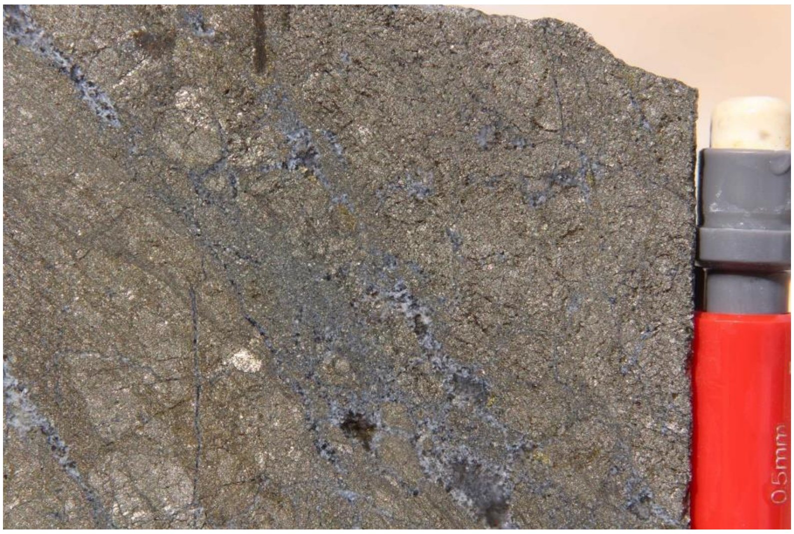


Photo 14 Massive pyrite D vein cut by bornite, DDH SMD028, 582.2 m.

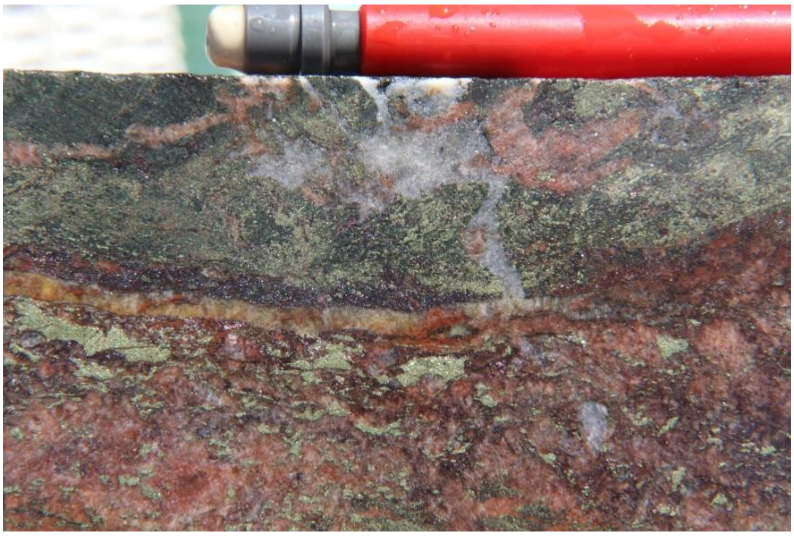

Phot 15 Splay fault characterised by pyrite-chalcopyrite-bornite with prograde chlorite wall rock alteration cut by later anhydrite, DDH SMD044, 589.1 m.


Photo 16 Chlorite-magnetite-haematite alteration associated with chalcopyrite-bornite and cut by later anhydrite, DDH SMD044, 676.3m.

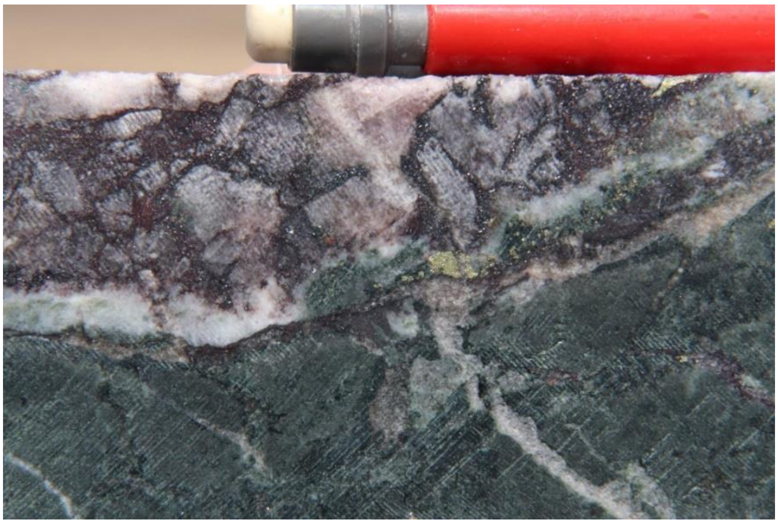


Photo 17 Chlorite-magnetite altered Mg basalt with chalcopyrite-bornite cut by anhydrite which is brecciated and infilled with specularite matrix, DDH SMD044, 669.8 m.

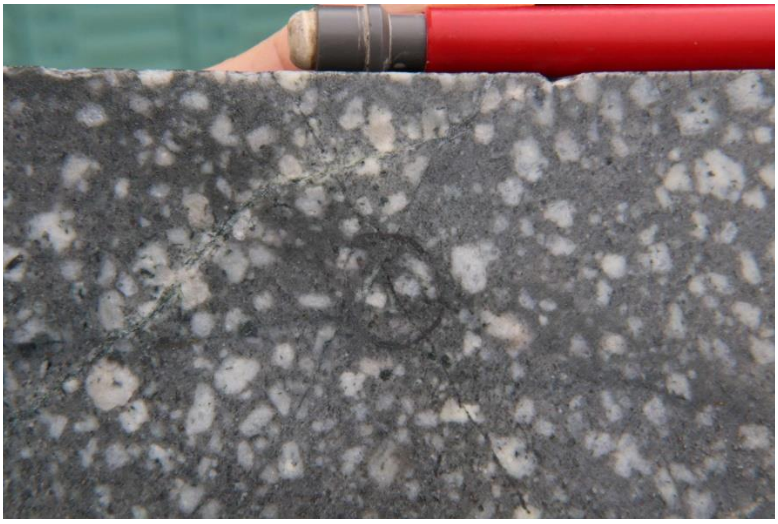


Photo 18 Magnetite fracture fill cuts sericite altered quartz diorite porphyry, DDH SMD028, 571.2m.

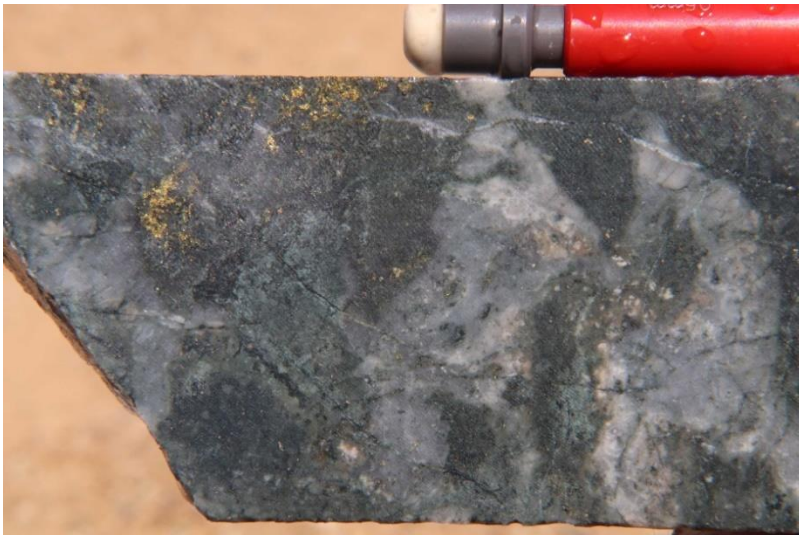


Photo 19 Irregular quartz-chalcopyrite veins hosted by magnetite altered wallrock, DDH29 818.3

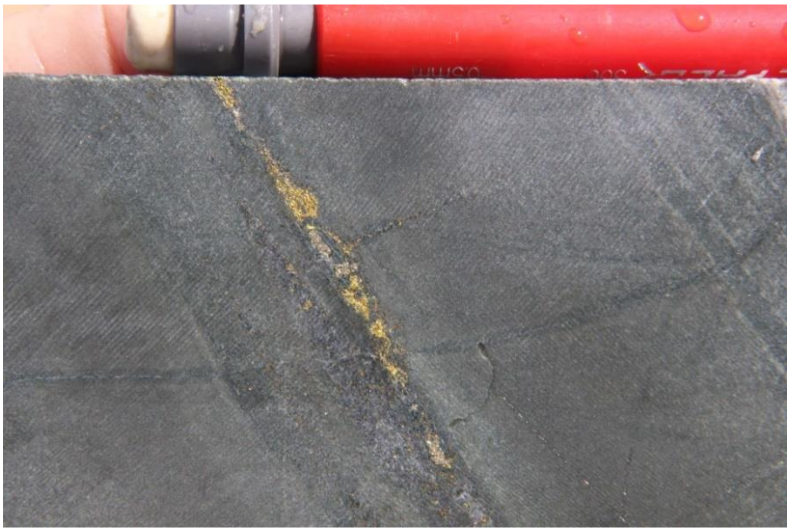
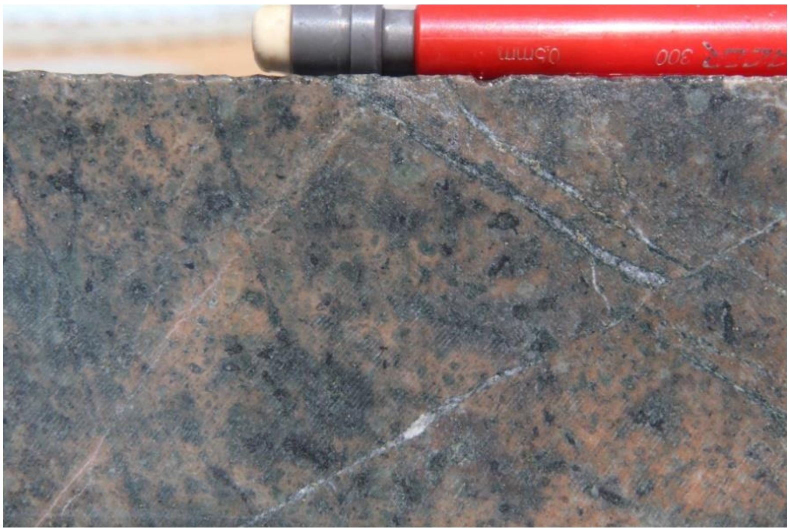


Photo 20 Chalcopyrite on a reactivated bedding plane, DDH SMD029, 831.1 m.



Phoot 21 Wallrock K-feldspar-magnetite alteration with possible actinolite, DDH SMD029, 818.3 m.

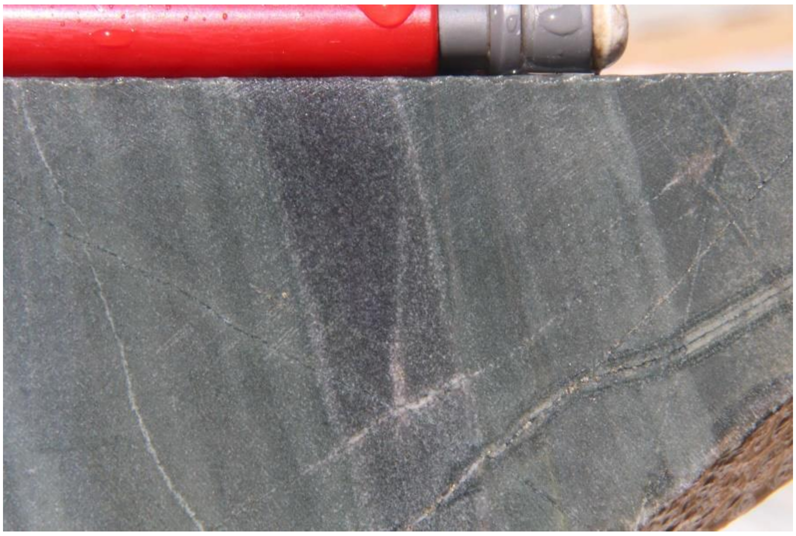


Photo 22 Replacement of a sedimentary horizon by magnetite, DDH SMD029, 825.5 m.

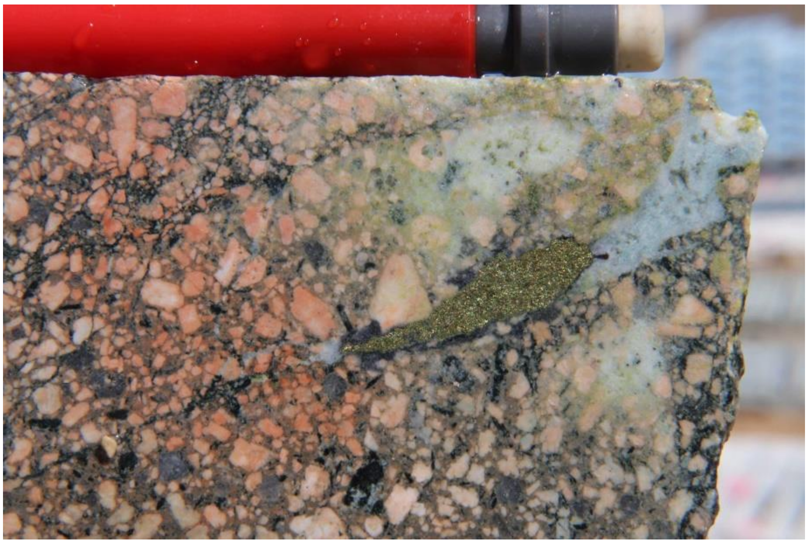


Photo 23 Mt Stavely prospect coarse grained dacite with chalcopyrite rimmed by bornite with epidote-quartz alteration, DDH MSD001, 406m.