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A REVIEW OF DRILL HOLES N62DDH011-015, TRIPELA PROSPECT WEST NEW BRITIAN, PAPUAN NEW GUINEA FOR PAPUAN MINING PLC

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SUMMARY

Tripela prospect, located on East New Britain Island, PNG, and hosted within Eocene to Oligocene andesitic to dacitic volcanic and volcaniclastic rocks of the Kapuluk and Baining Volcanics on West New Britain, is situated within an arcuate low in the aeromagnetic data which is inferred to represent a caldera and associated ring fractures. A large elevated response in the aeromagnetic data, situation south of Tripela prospect, could represent the manifestation of magnetite deposited within a proximal to porphyry-environment, or less prospective magnetic andesite. This target should be investigated further with surface geological mapping as a priority AB.

Recent drill holes N62DDH011-015, bored into the Tripela Prospect, intersected a package of quartz-eye bearing weakly brecciated dacitic volcanics, which exhibit flattened fiamme, and have been intruded by high-level diorite domes with brecciated margins. Dacitic volcanics exhibit pervasive moderate to strong chlorite-adularia-hematite-silica alteration interpreted to be the formed by the dissolution of volcanic glass during diagenetic compaction of the volcanic pile. Strong epidote-magnetite alteration, interpreted by petrographic and SWIR analysis as skarn-style and inner propylitic alteration which, along with elevated down-hole Mo values, are interpreted to represent a zone of propylitic alteration typical of that formed marginal to porphyry Cu-Au style mineralisation, and might to vector towards an inferred caldera-margin ring fracture as a source region. Similarly, chalcopyrite and bornite mineralisation reported in petrographic analysis of samples from N62DDH013 also provide an exploration vector toward the ring fracture which should be followed up with deeper drill holes as a priority A to test for possible porphyry related Cu-Au mineralisation emplaced within this dilatant structure. The common occurrence of gypsum veins within Tripela drill holes is consistent with other porphyry Cu-Au projects globally and interpreted to have been produced during the late phyllic alteration event in association with D vein formation.

A large, 800 x 1200m, zone of elevated Cu-Mo-Pb-As±Zn in soil samples, coincident with intense illite-sericite-chlorite-pyrite altered volcanics, represents a target that has not been adequately tested and therefore requires drill evaluation with a priority A. Elevated Mo reported from the upper parts of drill holes collared just south of this zone also supports the notion that this remains an untested high priority drill target. As a priority AB the soil sample collection grid should be extended over the interpreted position of the inferred ring fracture.

INTRODUCTION

At the request Papuan Mining PLC a desktop review was completed of available drill core and GIS data, and consultant reports, in order to comment on possible exploration vectors towards economic porphyry-related Cu-Au mineralisation and provide recommendations for the next phase of work at Tripela prospect. While this report draws on previous field observations and available data, it did not involve any field inspection of drill holes N62DDH011-015. The assistance provided by Kieran Harrington and Chris Muller during this review is gratefully acknowledged.

Recommendations for further work on prospect areas have been prioritised to take them to the next decision point. 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. Areas have been categorised using the following scheme:
A – Of highest interest such that the proposed exploration program should complete immediately. However, early stage projects with untested potential might be rapidly downgraded from this stage by completion of the planned work program.
B – Of some interest and should be subject to additional 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 additional 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, sale or relinquished.

REGIONAL GEOLOGY

The stratigraphy of New Britain, as detailed in Menzies and Corbett (2014), comprises a thick basal sequence of late Eocene basaltic to andesitic lavas, breccias and associated sedimentary rocks which are overlain by Oligocene island-arc volcanic rocks and intruded by their plutonic equivalents (Sheppard and Cranfield, 2012). The hiatus in volcanism in the Miocene is marked by an extensive limestone shelf sequence, now discernible as karst topography, which is overlain by Pliocene volcaniclastic sedimentary rocks (Sheppard and Cranfield, 2012). The Nakru property is hosted within andesitic to dacitic volcanic and volcaniclastic rocks of the Oligocene Kapuluk Volcanics, and the Eocene Baining Volcanics (Christopher, 2002). These volcanic rocks are of basic to intermediate composition and interpreted to be greater than 600m thick. Sediments consist mainly of marine conglomerates, sandstones and siltstones with minor limestone lenses. The acid to intermediate composition Kapuluk volcanics are compositionally similar to the Banning Volcanics and co-magmatic with the upper Oligocene volcanic rocks (Christopher, 2002).

The 150 x 25 km Kullu-Fulleborn Trend forms part of a prominent corridor of Upper Oligecene-Pliocene intrusions and volcanic rocks extending from south-east and north-west to across New Britain from Fulleborn Bay on the south coast to Eleonora Bay on the north coast of West New Britain (Muller et al., 2013) (figure 1). An interpretation of the gravity data and crustal depth studies by Wiebenga (1973) and Finlayson and Cull (1973) suggests the Kulu-Fulleborn Trend represents a fundamental structural boundary of sub-crustal extent. Significant zones of mineralisation have been previously reported along this trend including: Kavola East Prospect (Pliocene; epithermal Au), Kulu-Simuku porphyry Cu system (Upper Oligocene; Cu, Au), Plesyumi porphyry Cu (Upper

Oligocene; Cu), Nakru Prospect (?Lower Miocene; Au, Cu) (Mackenzie, 1975; Hine and Mason, 1978; Titley, 1978). An interpretation of aeromagnetic data for the Nakru region by Menzies and Corbett (2014) defined a EW trending sigmoid shaped zone of reduced magnetic intensity, possibly resulting from magnetite destruction, which might have developed as a dilatant flexure or link structure (fault jog) during interpreted extension-related sinistral movement on the Kulu-Fulleborn Trend (figures 1 & 2). This flexure appears to have facilitated the formation of caldera-style ring fractures and localised the Cu mineralisation which occurs at Papuan Mining's Tripela and Coppermoly Limited Nakru prospects (Inferred Mineral Resource of 38.4 million tonnes grading 0.61% Cu + 0.28g/t Au + 1.80g/t Ag (at a 0.2% Cu cut off), containing 233,400 tonnes of copper, 11 tonnes of gold and 69 tonnes of silver, Coppermoly Limited website, 2015).

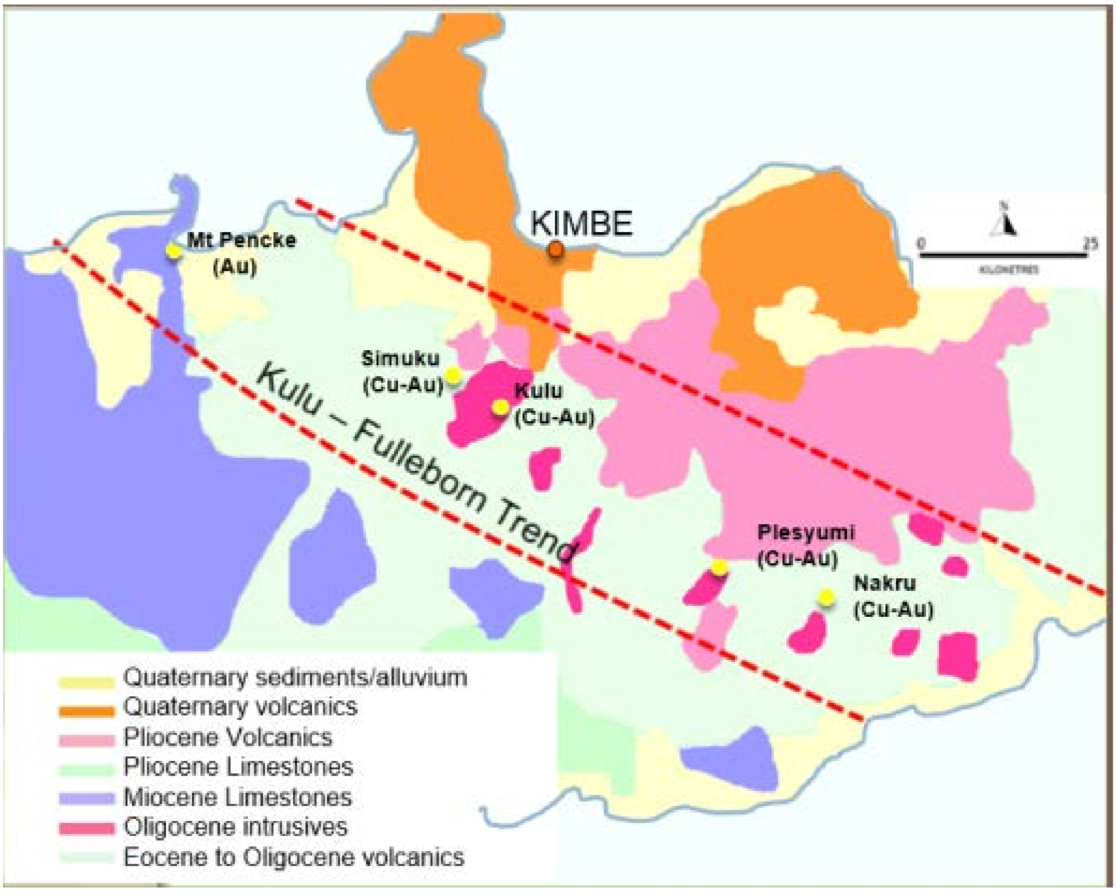

Figure 1. Oligocene intrusives within Eocene to Oligocene volcanics and areas of mineralisation along the Kulu-Fulleborn trend (Muller, et al., 2013 from Menzies and Corbett, 2014).

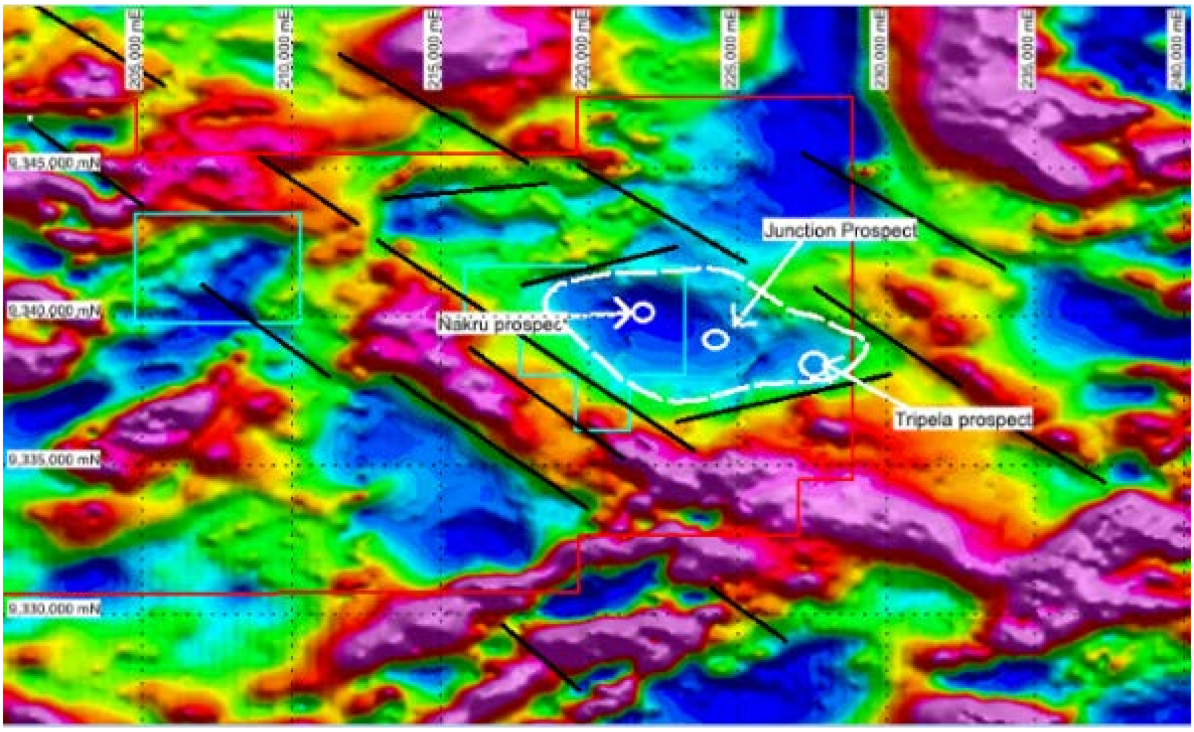

Figure 2. Reduced-to-Pole aeromagnetic data showing Cu-Au prospects within an interpreted fault jog developed during sinistral movement on the NW regional fractures, which facilitated the formation of a caldera with rim fractures (dotted white line) (from Menzies and Corbett, 2014). Orthogonal NS compression on the New Britain island arc is interpreted is interpreted to have resulted in sinistral movement on the conjugate NW fractures.

TRIPELA PROSPECT LOCAL GEOLOGY

Geology and structure

The Tripela prospect comprises an intercalated volcanic sequence of lithic and fiamme-bearing lapilli tuffs intruded by high level dacite domes and andesitic dykes (Menzies and Corbett, 2014). This volcanic package is interpreted to have been deposited within a resurgent caldera due to the voluminous pyroclastic sequence and circular ring fracture, identifiable from an arcuate magnetic low evident in the aeromagnetic data, and is analogous to similar caldera environments at Drake NSW (Cumming et al., 2013), Taupo, New Zealand (Cas and Wright, 1992) and Rabaul PNG (McPhie et al., 1993). Intrusion-related mineralisation occurs at Drake (Cumming et al., 2013). The arcuate aeromagnetic low at Tripela prospect has possibly been produced by the hydrothermal destruction of magnetite within the host rock by hydrothermal alteration. A large elevated response in the aeromagnetic data, situation to the S of Tripela prospect, could represent fresh, magnetic andesite or the manifestation of introduced magnetite deposited in a proximal-to-porphyry environment, and should be investigated further with surface geological mapping as a priority AB.

Recent geological mapping has identified a conjugate set of andesite dykes oriented NNE and NNW, with a lessor N-S and E-W orientation, that are isolated to within the inferred ring fracture (Muller, pers comm, 2015). Recent work has identified a large zone of strongly silica-clay-pyrite altered volcanics which increases in intensity to the S and terminates abruptly within lithic tuffs coincident with the position of the inferred ring fracture. Again this alteration is restricted to within the ring fracture environment.

Surface soil geochemical data

As previously reported in Menzies and Corbett (2013), and reinterpreted herein, soil samples collected over Tripela prospect, and analysed with a handheld XRF, highlighted a zone with coincident elevated Cu (>85ppm), Mo (>3ppm up to 24ppm), As (>6ppm), Hg (>7 ppm), Pb (>9ppm), Fe (>7%), and to a lesser extent Zn (>105ppm) which extends for 800m in a N-S orientation and 1200m in an E-W direction (Menzies and Corbett, 2013) (figure 3.). Recent geological mapping by Muller (pers comm, 2015) identified white-grey illite-chlorite-pyrite altered volcanics directly coincident with this zone of elevated Cu-Mo-As-Pb±Zn in soil samples. Drill holes bored to the south of this anomaly (figure 3) have not adequately tested the entirety of this zone and should be followed with additional drill holes as a priority A. It is also recommended that the current soil sample grid be extended over the interpreted position of the caldera ring fracture to determine whether this structure has facilitated the migration of metal bearing magmatic fluids and to aid with further drill target identification as a priority AB.

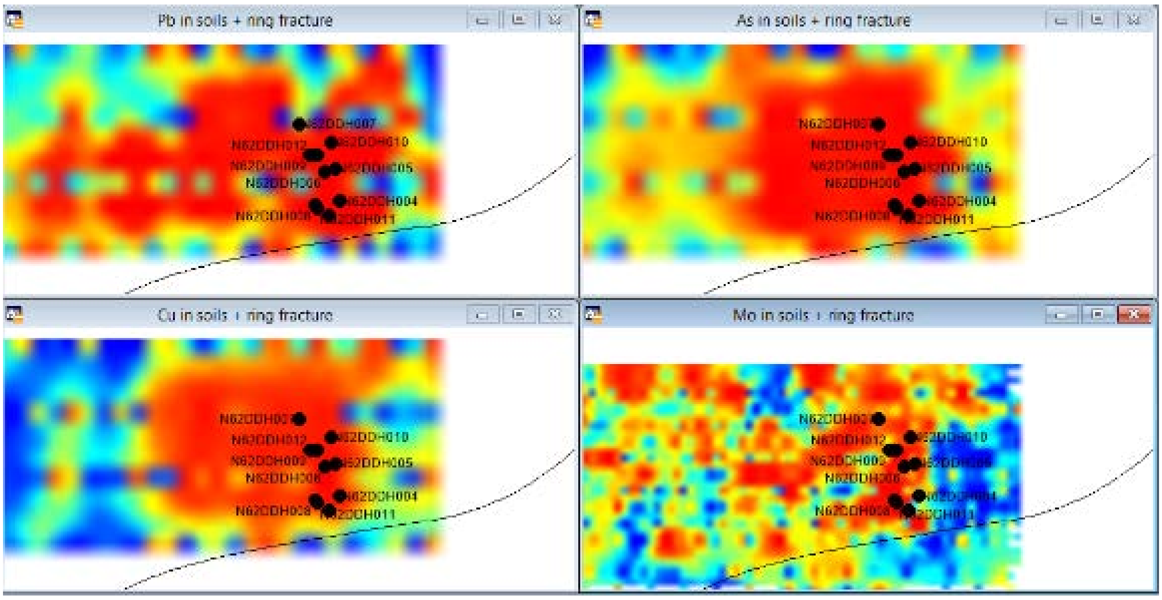

Figure 3. Gridded soil sample data collected over the Tripela prospect showing drill hole locations and the position of the inferred ring fracture (black line).

Drill hole N62DDH011-015 data

Lithology

Surface geological mapping and geological logs from drill holes N62DDH011-015, bored into Tripela prospect, describe an intercalated sequence of fiamme-bearing lapilli and lithic tuffs intruded by dacite domes and andesite dykes similar to that observed in core from earlier drill holes (Menzies and Corbett, 2013, 2014). This sequence, which appears to be constrained by the interpreted ring fracture, strikes approximately WNW and dips shallowly (~30˚) to the south (Muller, pers comm, 2015). Core photos for drill holes N62DDH012 and N62DDH015 (Harrington, 2015) indicate these holes have bored through permeable quartz-eye bearing dacite volcanics (photos 1 & 2) which are weakly brecciated (photo 3) and exhibit flatten pumice (photo 4). This highly permeable volcanic sequence has been intruded by microdiorite domes (photos 5 & 6) which locally exhibit brecciated margins (photo 7) and small, late magnetite bearing dykes (photo 8).

As suggested previously by Menzies and Corbett (2014) the Tripela prospect is interpreted to be located within a caldera-style extensional volcanic regime which comprises a dacite-rich volcanic pile that has been intruded by high-level diorite domes. The caldera ring fracture structural setting is likely to have provided a dilatant focus for the emplacement of sulphide bearing D veins and high level diorite domes. Considerable collapse is expected across these structures.

Hydrothermal alteration

The highly permeable dacitic volcanics display strong to intense chlorite ± hematite alteration of the groundmass and fiamme (photos 1 & 4) with local obliteration of the original rock texture (photo 3). The weak to moderate pink colour in the groundmass of the dacite volcanics (photos 1, 3 & 4) is indicative of low temperature K-feldspar (adularia), which is interpreted to have formed by the dissolution of volcanic glass during diagenetic compaction of the volcanic pile (McPhie et al, 1993). Pervasive, moderate to strong epidote alteration, evident within the massive diorite domes and marginal breccia facies (photos 9-11), along with disseminated magnetite (photo 12), maybe have been produced by heat and fluids that have emanated from the high level domes or, as part of an inner propylitic alteration assemblages associate with a porphyry Cu-Au system. Petrographic analysis of drill core from 863.6m (sample 61384) and 1066.7m (sample 61389) down drill hole N62DDH012 by Panda Geoscience (2014a) reported the occurrence of epidote-quartz-chlorite-amphibole-calcite which Panda Geoscience interpreted to represent skarn-style alteration (photos 13 & 14). Similarly, Quigley (2014) reported that the short wave infra-red (SWIR) data collected between 626.87-949.3m and 1054.4-1069m in drill hole N62DDH012 display signatures indicative of inner propylitic epidote-chlorite-calcite±albite alteration.

The common occurrence of gypsum veins in several of the Tripela drill holes (photo 13-15) is consistent with that observed by these authors at the Cu Hill porphyry Cu-Au prospect in NSW (pers obs, 2013, 2015) and is widely reported at other porphyry Cu-Au projects globally. For example Lickfold et al (2003), in their schematic space-time plot of the alteration, mineralization assemblages and multiphase intrusions at the Goonumbla porphyry copper-gold deposits, report gypsum associated with sericite-anhydrite-pyrite and hematite on the margins of the system. Field and Gustafson (1976) suggest that gypsum–pyrite veins are associated with sericite alteration and part of the D vein assemblage at the El Salvador porphyry Cu deposit. Similarly, gypsum veins are reported as the latest stage event that has heal fractures in the Panguna porphyry Cu-Au deposit (Ford, 1978) and in the Grasberg porphyry Cu-Au deposit (Pollard et al, 2005). Recent work by Sun et al (2015) proposed the common occurrence of anhydrite and gypsum in large porphyry systems is suggestive of an oxidized, sulphate-rich melt which they interpret is important in the concentration of incompatible Cu, Mo and Au into the aqueous phase.

While no high temperature biotite or orthoclase (K-feldspar) were reported from petrographic (Panda Geoscience, 2014a, 2014b) or SWIR data analysis (Quigley, 2014) some reports of amphibole (actinolite) alteration and skarn-style and inner propylitic epodite-calcite±albite are indicative of moderate temperature alteration which typically occurs on the margins of a porphyry Cu-Au system (figure 4) and is more prominent in drill holes N62DDH012 and N62DDH013 with increase proximity to the inferred caldera ring fracture.

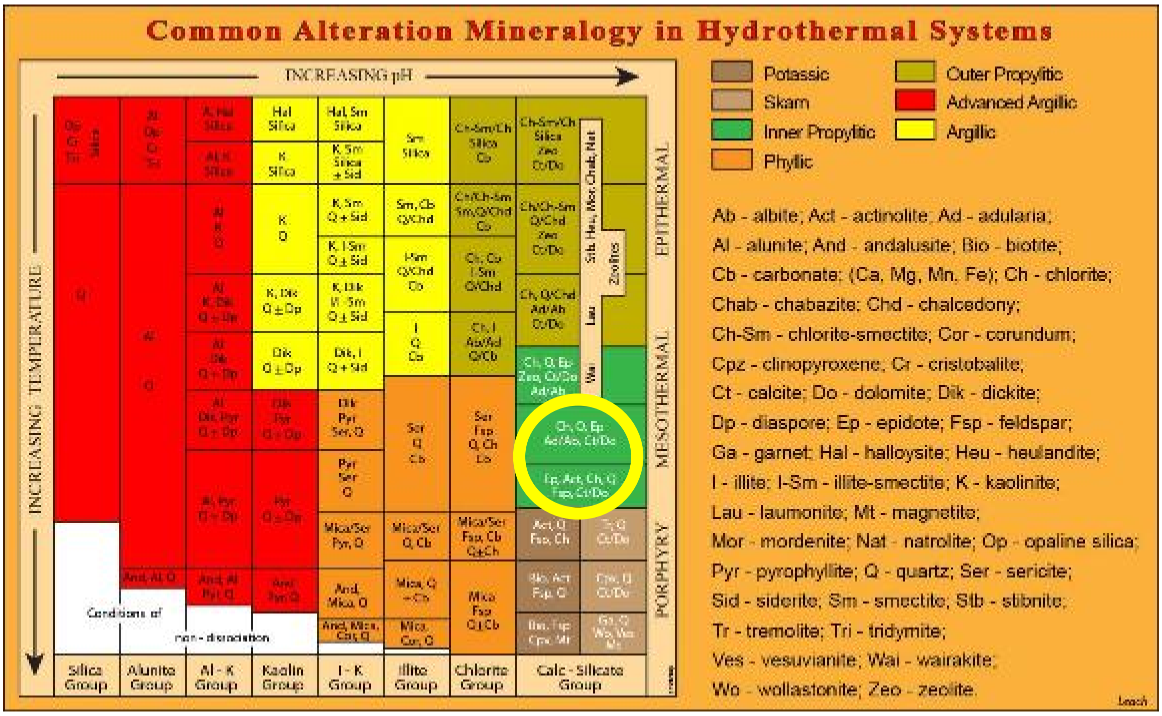

Figure 4. Alteration minerals in hydrothermal systems (Corbett and Leach, 1998) showing the assemblages reported from analysis of Tripela drill core (yellow circle).

<u>Mineralisation</u>

Continued surface geological mapping has identified Cu mineralisation (pyrite-chalcopyrite-covellite-chalcocite-malachite) within two brecciated D veins that are oriented 50-65˚ towards 175-190˚ (Muller, pers comm, 2015).

A 30-40cm wide, fault-hosted pyrite-rich D vein was intersected at approximately 748.5m down in drill hole N62DDH015 within dacitic volcanics (photo 16). Well-developed cubic pyrite has replaced mafic minerals within the diorite and is disseminated within dacitic volcanics (photo 2, 4, 17). Panda Geoscience (2014b) report the occurrence of bornite in drill hole N62DDH013 from 885.6 and 738.5m, associate with magnetite, which is indicative of a high temperature porphyry derived fluid.

As previously stated by Menzies and Corbett (2013), molybdenum is immobile within zones effected by intense weathering or hydrothermal alteration and is a good indicator of the margins of porphyry Cu-Au deposits such as >35ppm Mo at Wafi-Golpu, PNG (Menzies et al, 2013), > 43 ppm Mo at Bajo de Alumbrera, Argentina (Sillitoe, 1995), and > 30ppm Mo at Batu Hijau, Indonesia (Meldrum et al., 1994). An analysis of downhole assay and XRF data indicates zones of elevated Mo values increase with proximity to the caldera ring fracture and also occurs in high levels near the zone of anomalous Cu-Mo-Pb-As±Zn in soil samples (figure 5). It is interpreted herein that the inner propylitic alteration and elevated Mo values, situated proximal to the inferred caldera ring fracture, are indicative of high to moderate temperature fluids that may have been bleed up the ring fracture from a magmatic source at depth.

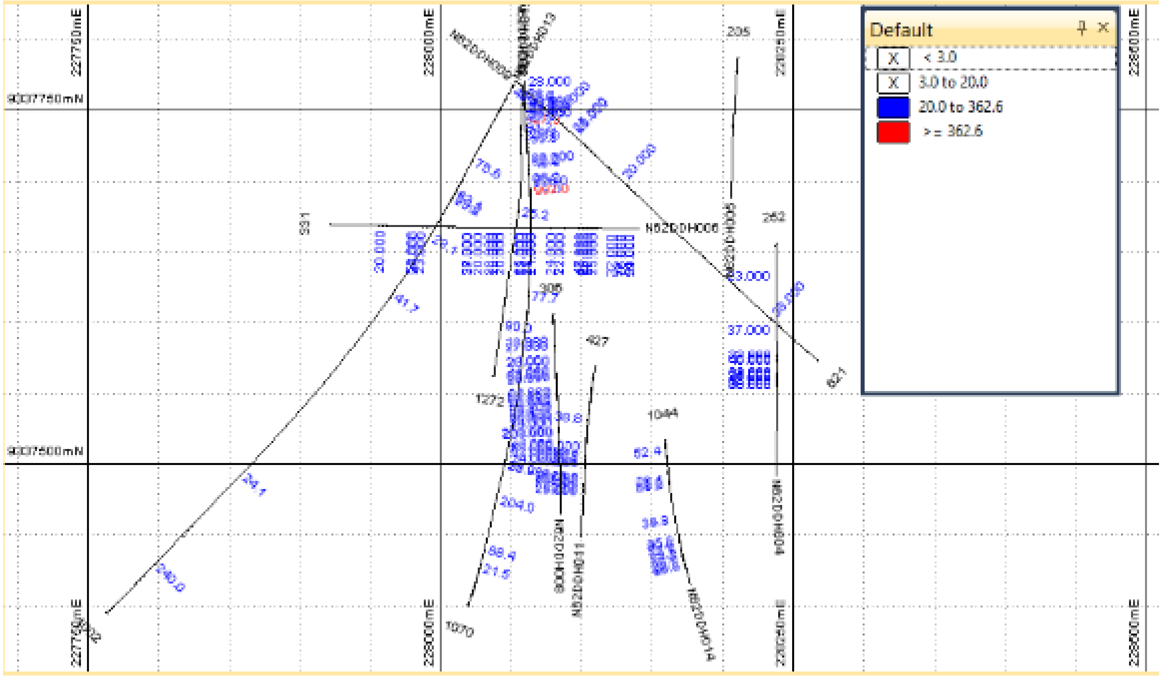

Figure 5. Drill hole Mo assays and XRF analysis (blue > 20-362ppm Mo, red >362ppm Mo) down-hole.

CONCLUSIONS

A large, 800 x 1200m, zone of elevated Cu-Mo-Pb-As±Zn in soil samples with coincident intense with intense silica-clay-pyrite altered volcanics represents a high priority untested drill target. Elevated Mo reported from the upper parts of drill holes collared just south of this zone also supports the interpretation that this region remains an untested high priority drill target. Mo is reported in the literature as an element that displays limited mobility in the weathered and hydrothermally altered environs and therefore represents a good indicator of the margins of porphyry Cu-Au-Mo style mineralisation such as Wafi-Golpu (Menzies, et al., 2014), Bajo de Alumbrebastura (Sillitoe, 1995), and Batu Hijau (Meldrum et al., 1994).

The highly permeable dacitic volcanics and epidote-altered diorite domes intersected within drill holes N62DDH011-015 are consistent with the previous interpretation by Menzies and Corbett (2014) that Tripela prospect area is located within a caldera-style extensional volcanic regime which consists of a dacite-rich volcanic pile that has been intruded by high-level diorite domes. Drill holes N62DDH012, N62DDH013 and N62DDH015 do not appear to have tested the ring fracture or caldera margin as inferred from aeromagnetic data (Menzies and Corbett, 2014). This ring fracture is interpreted to havve facilitated the emplacement of porphyry Cu-Au-Mo style mineralisation. Elevated Mo values at depth in drill holes N62DDH013 and N62DDH012, along with the occurrence of epidote-calcite±albite skarn and inner propylitic style alteration, as well as the occurrence of minor chalcopyrite-bornite mineralisation in N62DDH013, are suggestive of the possible leakage of moderate temperature Cu-Mo bearing magmatic fluids up the inferred ring fracture.

RECOMMEDATIONS

It is recommended that E-W and N-S fences of 300m deep holes should be bored across the 800 x 1200m Cu-Mo-Pb-As±Zn in soil sample anomaly with coincident silica-clay-pyrite altered volcanic rocks as a priority A, as previously proposed by Menzies and Corbett (2013). The soil sample collection grid should be extended to cover the new inferred position of the caldera ring fracture as a priority AB.

Additional drill holes should be competed, as a priority A, into the southern part of the Tripela prospect to intersect the proposed caldera ring fracture at depth and test for high temperature potassic alteration, A or B style quartz veins and chalcopyrite±bornite mineralisation. Further work should continue, as priority AB, to generate additional prospects in the Whiteman Range to provide a continued exploration focus as per the previous recommendations (Menzies and Corbett, 2014).

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Photos

Photo 1. Chlorite-hematite ± adularia altered dacite volcanic with disseminated pyrite from 838.m in drill hole N62DDH015 (Harrington, 2015).

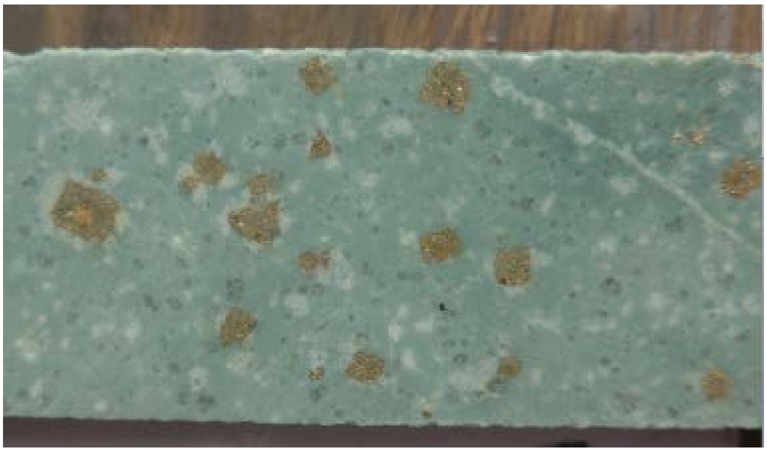

Photo 2. Quartz-eye bearing dacite volcanic with strong chlorite alteration and disseminated cubic pyrite which has replaced mafic minerals from 888.8m in N62DDH015 (Harrington, 2015).

Photo 3. Weakly brecciated highly permeable dacite volcanics with strong chlorite-adularia-silica alteration from 899.85m in drill hole N62DDH015 (top) and 595m in drill hole N62DDH012 (bottom) (Harrington, 2015).

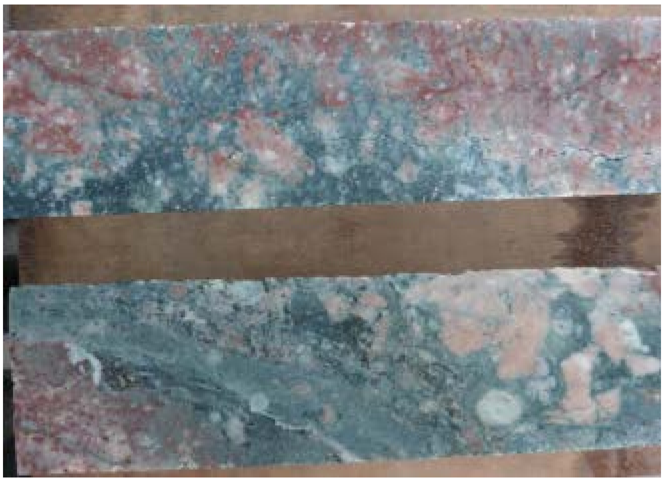

Photo 4. Chlorite-hematite-adularia (pink)-silica altered dacite volcanic with flatten pumice from 857.3m in drill hole N62DDH015 (top) and 564m in drill hole N62DDH012 (bottom) (Harrington, 2015).

Photo 5. Massive moderate to strongly epidote altered diorite from 1137 to 1156.8m in drill hole N62DDH015. Note a darker magnetic dyke in the middle of the photo from 1143.2 to 1144.1m (Harrington, 2015).

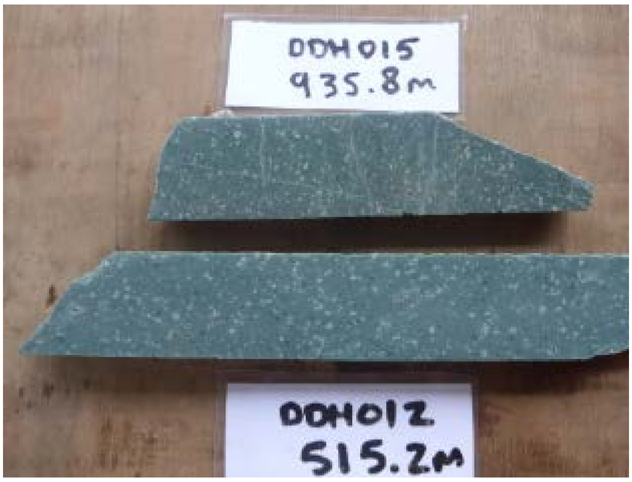

Photo 6. Diorite from 935.8m in drill hole DDH015 (top) and 515.2m in drill hole N62DDH012 (bottom) (Harrington, 2015).

Photo 7. Brecciated diorite with weak epidote alteration from approximately 953-961m in drill hole N62DD015 (Harrington, 2015).

Photo 8. Sub-parallel magnetite-bearing dykes which cuts dacite and has given the core a banded appearance. Magnetic susceptibility values are in CGS units from 144m depth in drill hole N62DDH015 (Harrington, 2015).

Photo 9. Pervasive epidote alteration in fine grained diorite from 1141m in drill hole N62DDH015 (Harrington, 2015).

Photo 10. Intense epidote alteration in diorite from 1151.3m in drill hole N62DDH015 (Harrington, 2015).

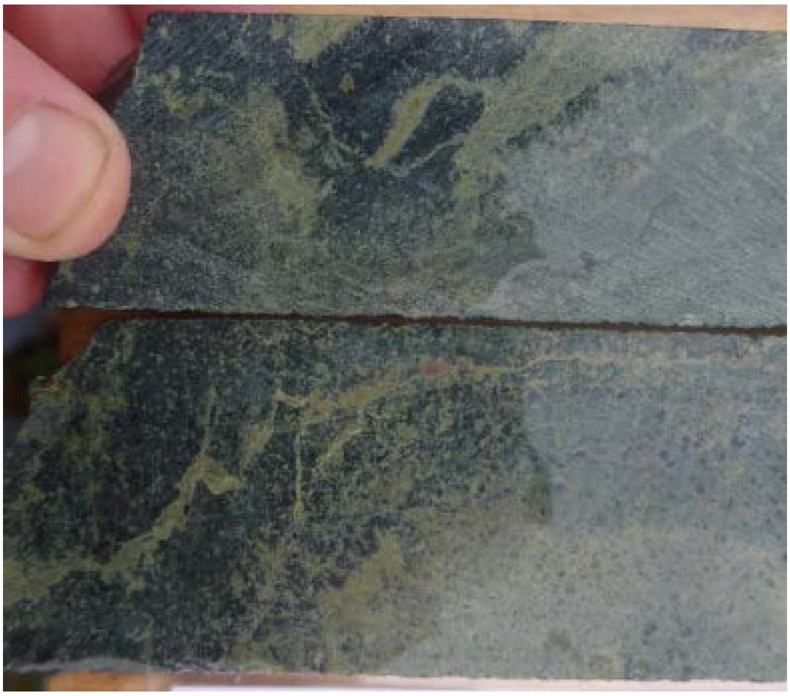

Photo 11. Intense epidote alteration in diorite from 1,179.6m in N62DDH015 (top) and 871.6m in N62DDH012 (bottom) (Harrington, 2015).

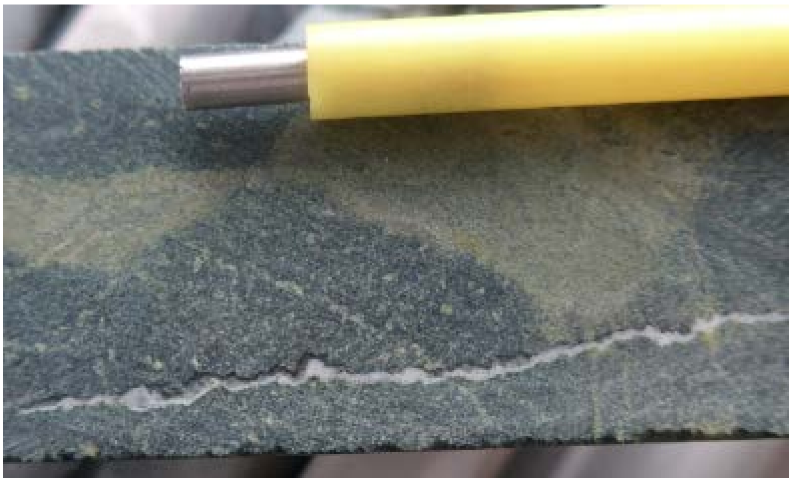

Photo 12. Disseminated magnetite in diorite and on the margins of a thin quartz vein from N62DDH015 (Harrington, 2015).

Photo 13. Sample N62PET 61384 which exhibits skarn-like intense epidote-chlorite-quartz-gypsum-calcite-hematite-amphibole alteration of a diorite porphyry from N62DDH012, 863.6m.

Photo 14. Sample N62PET 61390 which exhibits chlorite-quartz-calcite-gypsum-adularia-pyrite-epidote altered and brecciated andesite from 738.5m in drill hole N62DDH013.

Photo 15. Gypsum and quartz veined dacite dome, from 425.5m in drill hole N62DDH009.

DDH015 748.8m pyrite vein in dacite/silicified fault zone

Photo 16. Pyrite-rich D vein associated with a silicified fault zone which cuts dacite from 748.8m in N62DDH015 (Harrington, 2015).

Photo 17. Diorite with disseminated pyrite and intense chlorite alteration from 975m in drill hole DDH012 (top) and from 925m in drill hole N62DDH015 (bottom) (Harrington, 2015).