START

MOLOPO AUSTRALIA LIMITED

PARINGA MINING AND EXPLORATION COMPANY PLC

PROSPECTING AREA LICENCE 19

RETURN FOR THE PERIOD ENDING 30TH MARCH 1987

M.K. MacLENNAN
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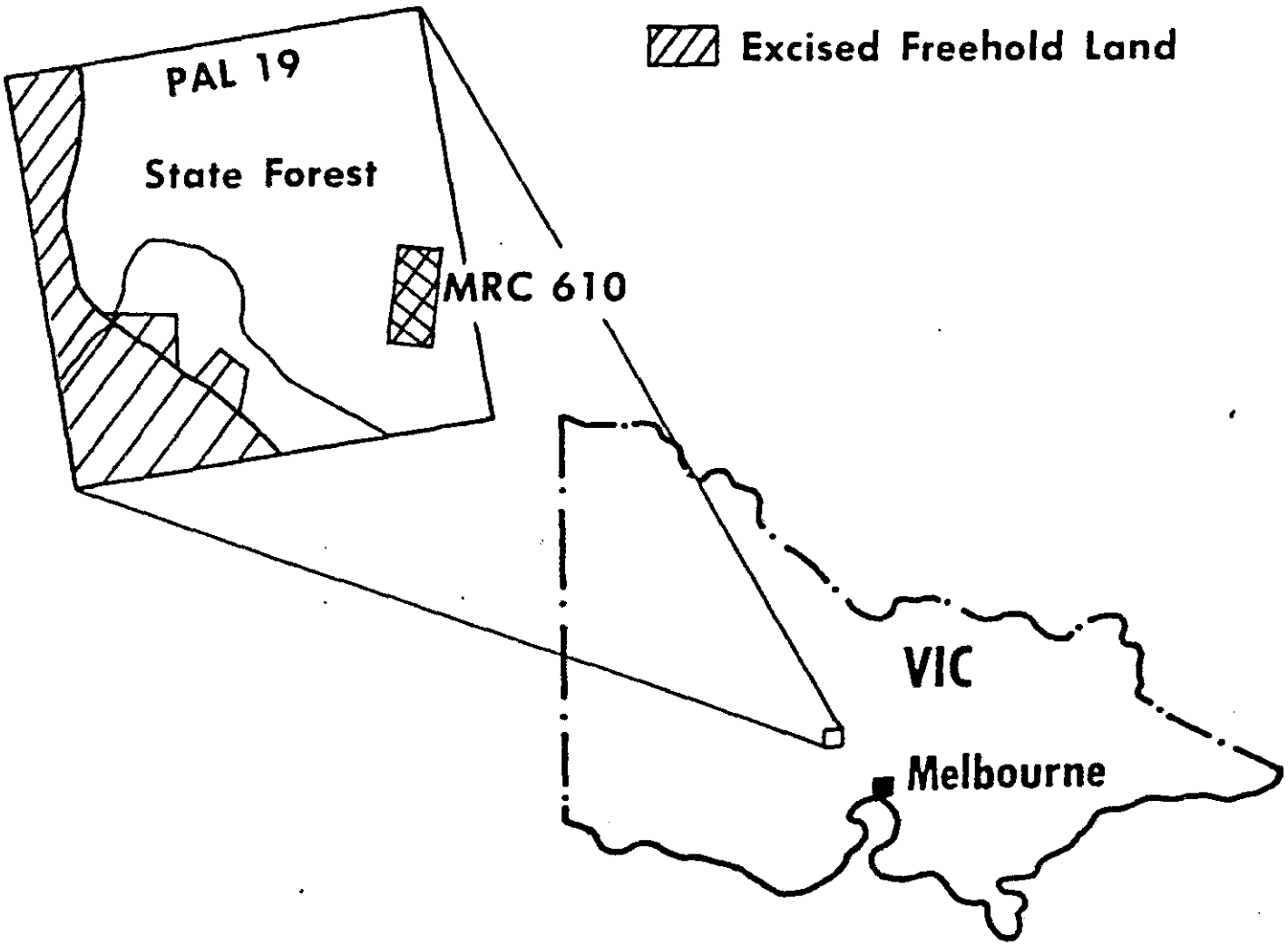
1. SUMMARY

Molopo Australia Limited has investigated the gold and antimony mineralisation associated with quartz veining at Belltopper Hill, located within Prospecting Area Licence 19.

Investigations including a diamond drill test program and detailed mine mapping concentrated on the "Missing Link", "Panama" and "West Panama" lodes. Sample analyses of the drill core intersections produced low gold values. An increasing understanding of local geology enables some explanation for this and provides encouragement for future exploration.

2. TENURE

Prospecting Area License (PAL) 19 of about 40 hectare, is situated about 3 kilometres west south-west of the township of Malmsbury, 100 kilometres north-west of Melbourne, Victoria (Figure 1), and includes Belltopper Hill. PAL 19 was granted for one year from January 9, 1986 to Paringa Mining and Exploration Company PLC (Paringa). Mineral prospects to be explored by Paringa lie within the Fryers Range State Forest which occupies most of PAL 19. Areas of private land within PAL 19 are excluded from the terms of the Licence. PAL 19 surrounds Miners Right Claim (MRC) 610 of 1 hectare held by the estate of Mr L. Gross. Paringa holds exploration interests in MRC 610 via to a farm-in agreement established on the 22nd June, 1986.



MALMSBURY AREA
LOCATION & TITLE MAP

Figure 1.

3. EXPLORATION HISTORY

Mining and Exploration History

Exploration and mining date from the discovery of reefs in 1876. Records of the main mining activity in the region to 1915 are poor. Total recorded production of the North Drummond Goldfield, of which PAL 19 forms a part, was about 98,000 tonnes of ore milled at an average grade of 29 g/t Au. 85% of this came from the mines south of PAL 19. The ore was almost certainly hand sorted before treatment. Greatest depths reached in the mines in the region was 244 metres (800 feet) and reefs could be traced along strike for over 610 metres.

The most recent work of significance was in 1968 to 1970 when Planet Gold Ltd ("Planet") and Centaur Mining N L ("Centaur") explored for gold and antimony.

Planet distinguished between the north-south reefs which were essentially only gold-bearing and were seen in the important mines south of PAL 19 (O'Connor, Queens Birthday) and the north-east striking shears, such as the Leven Star, which are gold-antimony bearing. More recent investigations (this report) redefine the north-south reefs to be striking (north) north-west and carrying varying concentrations of stibnite. Planet concluded that the gold and stibnite represent slightly different ages of mineralisation and that deposition was controlled by structural factors. Strongest mineralisation was postulated, but not demonstrated, to occur where these reef and shear structure cross.

This work has been reported by John Taylor & Sons (1968) and D.L. Farmer (1970) representing Planet and Centaur respectively. Exploration by Planet centred mainly outside the area of PAL 19 but a programme of work was undertaken on the Leven Star reef (MRC 610) and included geochemical soil and reef sampling. They recognised a silicified zone up to 8 metres wide and traced the

reef over a strike length of about 245 metres.

Percussion drill hole samples and channel samples returned average assay values from 6 g/t to 7.5 g/t over widths of about 2 metres and a strike length of 245 metres. (Taylor 1968).

Centaur undertook geological mapping and limited sampling of reefs. They recommended underground exploration of the Leven Star reef but apparently abandoned the area.

Since 1982, Paringa and affiliates have explored the area, acquiring colour aerial photography and concluding underground geological mapping and sampling of quartz reefs.

4. GEOLOGY

The Belltopper Hill area comprises lower Ordovician psammites (sandstones) and pelites (shales) which have been tightly folded about steep axial planes striking north north-west. Wavelength is approximately 300 metres although local reversals in bedding have been recognised which probably define parastic folding. The sedimentary sequence is covered by alluvials on the northern slopes of Belltoper Hill and outside the licence are partly covered by Quaternary basalts.

Moderate to strong faulting cuts the folded stratigraphy striking dominantly north-west to north north-west and dipping at intermediate to high angles in either direction. Mineralising fluids channeled through these brittle structures formed auiferous quartz lodes with greater width. Antimony as stibnite and other minor sulphides are present in the quartz veins.

The Missing Link Lode, striking 330^{o} and dipping steeply east, can be traced in collapsed stopes, costeans and shafts on the surface for approximately 300 metres. (Figure 2). An adit with the portal near Back Creek intersected the Missing Link lode located at 90 metres from the portal and 55 metres from the surface. The lode was driven for about 200 metres however the drive is now collapsed at 42 metres from adit. The Missing Link adit was continued 107 metres past the main lode without cutting further significant mineralisation although a stockwork of quartz veins was intersected.

The Panama Lode systems consitѕ of three reefs subparallel to, and west of the Missing Link lode. (Figure 2). An adit from the level of Back Creek was driven northerly for 31 metres and then cross-cut north easterly for 88 metres intersecting the West Panama Lode at 39 metres. This structure was driven north westerly for 9.5 metres. Stoping from this level (to surface?) is evident towards the end of the drive. The (north-easterly) cross-cut was extended to intersect the Panama Lode at 87 metres

which was driven north westerly. Winze development does not enable access beyond 14 metres in the Panama drive. Midway between the Panama and West Panama drives, a 10 metre southerly drive connects with the Panama shaft. It is reported that the shaft is 75.3 metres deep with three established levels including that of the adit level.

A 32 metre north-easterly cross-cut from the Panama adit intersected a near vertical fault-quartz vein development (West West Panama Lode) and was driven for 14 metres.

Other lodes within PAL 19 include (1) The Antimony Lode, which is a probable southern extension of the Panama Lode, has been worked from two adits at Back Creek level and surface pits over approximately 250 metres. (2) The Leven Star Lode which is located largely within MRC 610 and crops out over 210 metres striking north easterly and dipping steeply towards the east.

5. CURRENT INVESTIGATIONS

Work completed and reported in greater detail below includes:

i Accurate ground survey.

ii Drilling of three diamond drill holes, completed drill logs (Appendix i) and summary data expressed in plans accompanying this report.

iii Sampling of selected drill core intersections for geochemical analysis.

iv Mapping of accessible historical workings.

v Thin section preparation and descriptions. (Appendix ii).

vi Fluid inclusion studies.

i Survey

Preliminary ground surveys were undertaken to provide a base plan to assist geological mapping and to locate collars of the proposed drill holes, exploration adit portals and surface workings. The composite plan can be used for cross section construction and the subsequent projection of major structures.

ii Diamond Drilling

A diamond drilling programme was designed to test strike and depth continuation of the major mineralised structures, (Missing Link and Panama Lode series). Australian Diamond Drilling (Stawell, Victoria) were commissioned to drill three holes. Drilling operations began on the 6th of January and were completed on the 11th of February. Summary of the major intersections appear in Table 1.

DDH MA1

This hole drilled at 065° (mag) was planned to intersect the Panama/Antimony structure between 140 and 180 metres and the Missing Link structure between 250 and 300 metres from collar at -45° from horizontal. This would be approximately 145 metres and 240 metres below the surface and approximatley 115 metres and 185 metres below historical recorded development respectively.

The hole progressively swung 16° to the east and shallowed 8° in dip. It was terminated at 298.6 metres after reaching the (probable) target. (Figure 2).

Dominant rock type is a massive, fine grained psammite which often grades into a coarser grained feldspathic psammite (Appendix ii, MAP 002). Laminated pelitic intervals are also observed in the sedimentary sequence. Sharp and gradational contacts between the pelitic and psammitic units indicate the sequence is younging upwards.

To obtain orientation of bedding, the core was aligned parallel to the hole and rotated so that S0 was striking 350°; an assumed strike from the S0 relationships recognised in insitu outcrop throughout the Ordovician in central Victoria (Grey & Willman, 1985) and exposures in the Belltopper Hill underground workings. The two possible dip (orientations) were recorded although the steeper value is preferred owing to the chevron type folding of the Ordovician (Grey & Willman, 1985; Cox, unpublished report). S0 is west dipping with a reversal at 270 metres indicating the hole traversed an anticlinal fold closure.

A conglomerate unit consisting of pelitic clasts measuring up to 10 centimetres supported by a matrix of coarse psammite and white mica was drilled between 59.1 and 60.55 metres.

A dacitic porphyry (Appendix 2, MAP001) is intruded between 268.4 and 268.9 metres. The unit appears to have produced a narrow (1.2 centimetres) aureole on an underlying psammite and also

contains minor quartz veins.

Quartz veins comprising pyrite/stibnite mineralisation ($\leqslant$ 4 centimetres thick) between 158.10 and 158.8 metres and a strongly altered, partly brecciated pelite at 170.5 metres assaying 10.88 ppm Au could represent the Panama Lode structure.

Planar, quartz veins with pyrite/stibnite between 271.4 and 279 metres and a fault zone consisting of altered fragmental and amorphous material between 281.0 and 281.7 metres could correspond to the Missing Link structure.

DDH MA2

This hole drilled at 065° (mag) was planned to intersect the West Panama Lode between 90 and 120 metres and the Panama lode between 160 and 190 metres from collar at -45° from horizontal. This would be approximately 80 and 155 metres below the surface and 65 and 120 metres below Panama Adit level respectively.

The hole progressively swung 7° to the east, shallowed 5° in dip and was terminated at 182.3 metres after reaching the target. (Figure 2).

Again the dominant rock type was fine grained psammite with compositional gradation into (laminated) pelite and a less common textural/compositional gradation into the coarse grained, feldspathic psammite unit. A dacite porphyry was drilled at 152.2 metres.

S0 appears east dipping to 60 metres where it is then reversed until the end of the hole.

The West Panama structure was intersected between 87.0 and 103 metres which includes a combined width of 50 centimetres for mineralised quartz veins. One vein at 94.0 metres is 25 centimetres thick. No samples within this intersection exceeded

0.5 ppm Au.

The Panama structure was intersected between 160 and 168.4 metres for a combined width of 15 centimetres for mineralised quartz veins. Coarse ($\leqslant$ 4 millimetres) euhedral pyrite grains and larger anhedral aggregates of pyrite are recognised in some veins together with finer anhedral-subhedral grains of stibnite (/arsenopyrite). The wall rock is irregularly altered often showing "strong" bleached zones with intense disseminations of pyrite. A fault zone consisting of soft, altered, unconsolidated clay material with a possible graphitic component was intersected between 167.8 and 168.1 metres. Fine disseminations of pyrite are evident in the unconsolidated material. Quartz samples assayed over this intersection returned Au values of $\leqslant$ 1.2 ppm.

Between 16.0 and 19.5 metres, massive, brecciated quartz veins with varying proportions of pyrite and stibnite were intersected. Altered host rock was also partly brecciated to varying intensities. This interval of veining and mineralisation may represent the West West Panama structure. Quartz samples assayed through this intersection returned Au values of $\leqslant$0.8ppm.

DDH MA3

This hole drilled at 235° (mag) was planned to intersect the Missing Link structure between 100 and 140 metres from collar at -53° from horizontal which would be approximately 95 below surface and 35 metres below (assumed) historical workings. DDH MA3 may also test for the Panama structure. The hole progressively swung 4° to the west and shallowed 6° in dip. The hole was completed at 260.65 metres. (Figure 2).

Psammitic and pelitic lithologies showed evidence of surface ground water weathering to approximately 118 metres which is 50 metres below creek level. Largely unconsolidated clays, mottled with limonite (and haematite) and grains of angular quartz were prominent to approximately 40 metres. These quartz fragments probably represented decomposed quartz veins. From 40 to 118

metres the core became more solid, although haematite (limonite) staining was still evident in and about fractures. Excluding alteration, the core became fresh at approximately 118 metres, showing the dominant intervals of fine grained psammite with interbeds of pelite and the coarse grained, feldspathic psammite unit. The latter unit appearing irregularly between 145 and 183 metres. An anticlinal closure is inferred at approximately 85 metres although this is based on one dubious east dipping reading at 81 metres.

Mineralised veins (which total 70 centimetres) between 109 and 123 metres would represent the Missing Link Lode. A 10 centimetre fault zone at 109.4 metres is probably the hanging wall structural control. Veins often show subhedral growth of stibnite along the walls with pyrite disseminated within the vein structure. Some quartz veins are fragmented. Sericite and pyrite disseminations are present in alteration zones/halo's about veins. Quartz samples assayed returned gold values of $\leqslant$1.7ppm.

Mineralisation between 165 and 187 metres may correlate with the Panama Lode and includes a combined width of 60 centimetres for (mineralised) quartz veins sampling through this interval returned assay values of $\leqslant$0.7ppm Au.

High density planar to irregular quartz veins occur between 25 to 45 metres and 58 to 65 metres. These veins do not contain obvious sulphide material however those assayed returned values of $\leqslant$ 1.8ppm. Au.

Features common througout the three holes include:

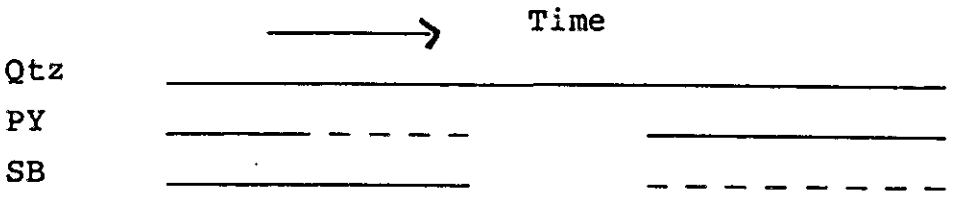
1) Quartz veins often show coarse quartz crystals aligned perpendicular to the vein wall. This is evidence for vein development in a dilational or extensional environment.

2) Zones of fragmented to unconsolidated core (faulting) occur at various intervals in the hole.

3) Pyrite (and arsenopyrite) disseminations are common in alteration zones. Pyrite is less concentrated in unaltered country rock.

4) Mineralisation is generally $\leqslant$ 1% of total quartz vein volume.

5) Cross-cutting relationships and location of sulphides in a vein structure suggest a generalised paragenesis of:



6) This shows quartz (Qtz) was deposited throughout the mineralising event whereas pyrite (PY) and stibnite (SB) deposition was more irregular. Alteration halo's are irregularly developed about brittle sturctures and are not necessarily proportional to the width of the vein/fracture

i.e. - fractures often have 2.3 cm halos
- some quartz veins (up to 8 cm) have no detectable alteration halo.

Cross-cutting relationships generally show the earlier generation veins/fractures have the better developed alteration zones.

7) Off-setting of veins/fractures by post-dating brittle structures is predominantly in reverse sense.

Projections of lode structures from historical workings through drill core intersections are shown in Figure 3a through c. Also represented are assumed lode intersections in one hole projected through a section of another hole. A comparison between both

types of projections enables changes in the geometery of lode structures to be recognised.

Cross-sections (Figure 3a through c) show the Missing Link lode has probably steepened along a northerly strike. The West Panama lode probably pinched out along a southerly strike since there is no significant mineralisation in MA1 where the MA2 projection would intersect. The Panama structure appears to shallow in the north from the MA2 Panama projection and intersection.

iii Geochemical Analysis of Selected Drill Core Intersections

(Table 1)

Hole	Interval	Assays (Weighted Average) in ppm		Comments
		Au	Sb	
MA1	158.10 - 158.25	2.000	170	Panama Lode?
MA1	158.75 - 158.78	5.100	15	Panama Lode?
MA1	170.40 - 170.45	10.830	290	Intense alteration zone - associated with Panama Lode
MA2	16.60 - 16.70	0.383	8	West West Panama Lode?
MA2	19.10 - 19.14	0.833	55	West West Panama Lode?
MA2	84.30 - 84.45	0.267	7	West Panama Lode?
MA2	91.55 - 91.6	0.483	330	West Panama Lode?
MA2	93.70 - 94.10	0.275	10	West Panama Lode?
MA2	99.29 - 99.35	0.333	30	West Panama Lode?
MA2	163.25 - 163.60	0.242	8	Panama Lode
MA2	164.15 - 164.27	0.475	9	Panama Lode
MA2	166.20 - 166.35	0.125	8	Panama Lode
MA2	167.45 - 168.10	1.220	280	Panama Lode
MA2	168.30 - 168.35	1.020	200	Panama Lode
MA3	35.30 - 35.60	1.830	190	Quartz vein stockwok
MA3	40.20 - 40.40	0.742	15	Quartz vein stockwok
MA3	109.20 - 109.31	1.700	45	Missing Link
MA3	114.95 - 115.05	0.317	10	Missing Link Lode
MA3	121.80 - 122.00	0.433	6	Missing Link Lode
MA3	123.10 - 123.35	0.733	10	Missing Link Lode
MA3	179.70 - 179.92	0.733	20	Panama Lode?

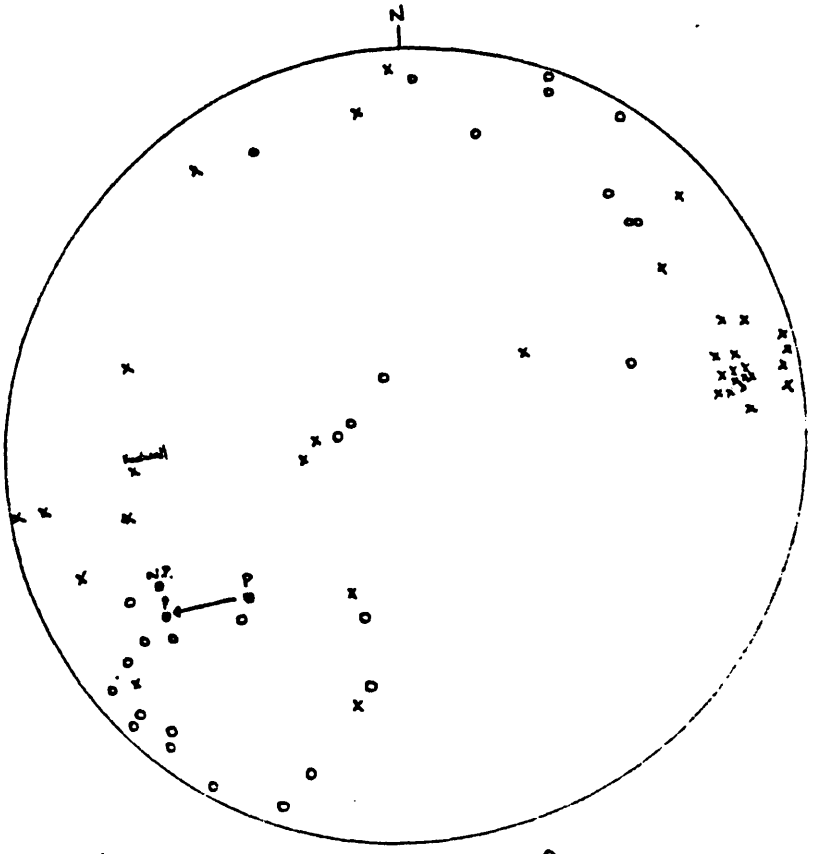
iv Mapping

Mapping of accessible historical workings was carried out on a 1:100 scale and include the Missing Link Adit & Drive, (Figure 4) the Panama adit and cross-cut and the Panama, West Panama and West West Panama drives. (Figure 5). The objective of the mapping exercise was to gain a greater understanding of the local geology and ultimately the structural controls on mineralisation.

Bedding (S0) relationships are often difficult to define in that they may either be confused with the penetrative cleavage developed in the pelitic units or degraded due to surface weathering of the adit/drive walls and roof. In the Missing Link adit S0 is predominantly west dipping although numerous reversals have been recognised in the vicinity of the drive. This may be due to parasitic developments, ("dragging" by the Missing Link brittle structure). Within the Panama adit, cross-cut and associated drives, S0 is consistently west dipping. Minor evidence indicates S0 is plunging shallowly to the north.

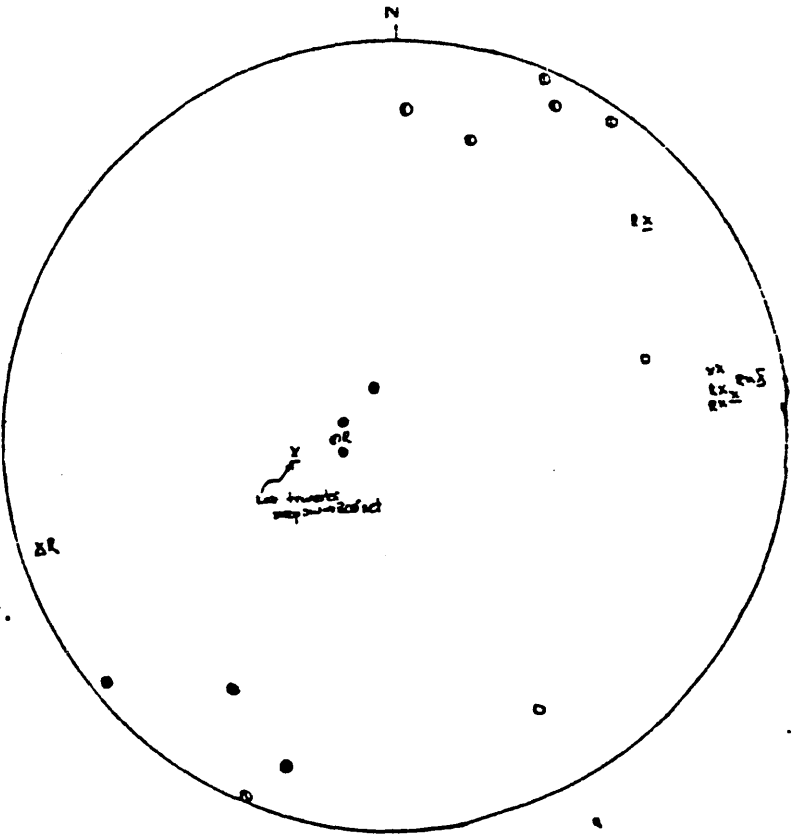
Brittle structures including veining strike generally between north-west to north north-west and dip either direction. An equal area projection from the Panama adit, cross-cut and associated drives shows specific relationships between structures (Figure 6). Faults and some fractures strike predominantly between 350-360^{o} and dip steeply towards the west; or parallel to S0. Veins strike at a low angle to the faults (between 300-340^{o}) and generally dip steeply towards the east. This relationship is consistent with all lode structures investigated and "thicker" (i.e. $\geqslant$ 10 centimetres) quartz veins in the Missing Link adit. That is, major dilational zones dipping east and therefore opposite to S0 (Figure 6) shows the West Panama and Panama lodes dip at a shallower angle than most veins.

Lode structures appear to be controlled by footwall and hangingwall brittle structures which are irregularly developed and not always obvious. Lodes sometimes appear controlled by other faults (fractures) which are orientated at low to



X : Poles to fractures / faults
O : Poles to veins (+ lodes)
W.P. : West Panama Lode.
P. : Panama Lode.
(Equal Area Projection)

Figure 6. Orientations of brittle structures.



⊙: Poles to vein; being cross-cut.
●: Poles to vein; being displaced
x: Poles to fracture; displacing.
$\underline{x}$: Poles to fault.
$\overline{x}$: Poles to fault; crosscutting.
$\overline{R}$: "Reverse" sense of displacement.
(Equal Area Projection)

Figure 7. Cross-cutting relationships between brittle structures

*NB. Data for the construction of these nets was obtained from the Panama Adit and associated historical workings. (see Fig. 5.)

intermediate angles to the major structure. This is evidenced in the West Panama drive where steep, west dipping fractures truncate the quartz zone and in the Missing Link drive/adit intersection where strong north-north east faulting looks to re-orientate the major dilational zone. A fracture developed adjacent to, and projecting into the Panama lode may explain the re-orientation and steepening of the latter along the northerly strike.

Multiple generations of brittle structures have developed as evidenced by cross-cutting relationships. Figure 7 which is specific to the Panama workings show that (some) faults/fractures from the steep west approximately 355^{o} set cross-cut and often displace veins. Displacement is ($\leqslant$ 25cm) dominantly in reverse sense.

vi Fluid Inclusion Studies

Samples of quartz have been collected from Belltopper Hill reef systems for fluid inclusion studies. Assuming the inclusions represent actual samples of fluids existing during ore and gangue deposition (Roedder, 1979), petrography and measurements of vapour-liquid phase homogenisation temperatures contribute to a compositional and physical description of the ore-forming fluid.

The relatively high proportion of stibnite in veins at Belltopper Hill is considered unusual and therefore a chemical and physical evaluation of the ore forming fluid is warranted. This may provide a better understanding on the style of mineralisation and possible fluid source which would assist further exploration efforts. Preliminary investigations have used two samples for petrography and heating using an adapted U.S.G.S. Gas-Flow Heating/Freezing System at Monash University, Melbourne.

Petrography. Fluid inclusions have been classified according to their phase relations at 25°C and includes the presence of immiscible liquid phases. As a result two inclusion types have been identified.

These are:

Type 1: Liquid rich inclusions. These are two-phase (liquid-vapour) in which the vapour occupies between 2 and 30% of the total inclusion volume. This type of inclusion is the dominant fluid inclusion type observed, and measures approximately between 3 and 15 micrometres.

Type 2: CO_2 - rich inclusions. These are three-phase (liquid-liquid-vapour) and contain liquid CO_2 coexisting with liquid H_2O at room temperature. These CO_2 inclusions are relatively large (10-20 micrometres) and contain vapour proportions of approximately 10% of total inclusion volume.

It is not possible to classify the inclusions into primary populations (i.e. those inclusions entrapped during crystal growth) owing to the high proportion of secondary inclusions, (i.e. those associated with past crystallisaton fracturing).

Temperatures of Homogenisation. Filling temperatures of fluid inclusions are obtained by heating the inclusions until the vapour phase homogenises with the liquid phase (TH) Figure 8 shows a wide range of TH values. Since the fluid inclusions cannot be classified into relative time of entrapment (see above), it is not possible to conclude the thermal evolution of the mineralising fluid. It can be inferred however that the fluid would have cooled in time, therefore higher temperatures (ie 270^{o}C) would have represented thermal conditons of the "early" fluid. Later pressure corrections may have to be applied to the TH data if it is assumed mineralisation was synchronous with Greenschist metamorphism. (See Discussion section).

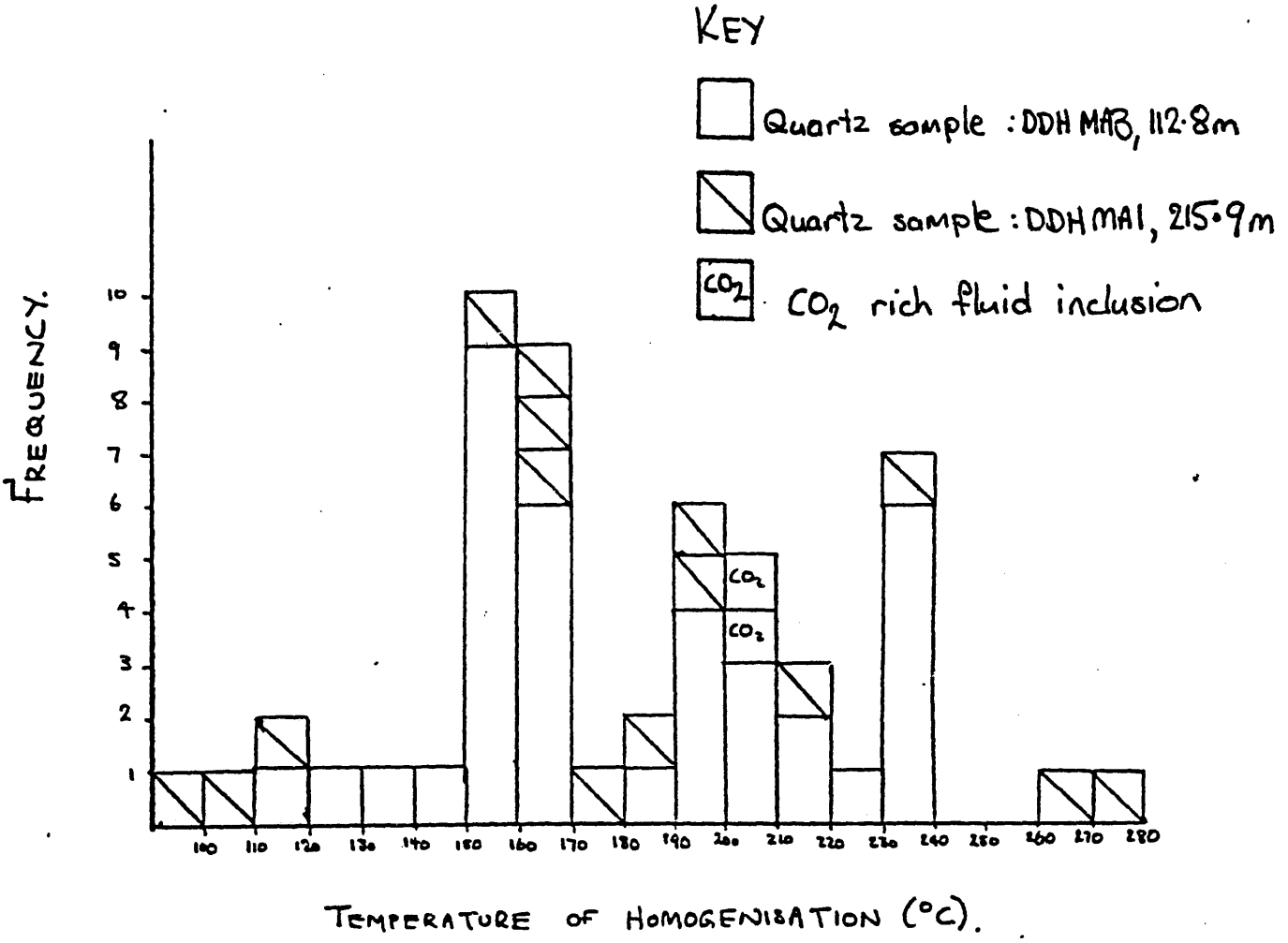


Figure 8. Histogram of Fluid Inclusion Temperatures of Homogenisation.

6. DISCUSSION

Brittle structures developed at Belltopper Hill can be broadly divided into two groups:

1. Faults and fractures which show relatively minor evidence for fluid movement. These are usually concordent with bedding and have developed by a reverse sense of displacement as evidenced by displacment relationships with earlier structures (veins).

2. Dilational quartz filled structures which generally strike at low angles to bedding. Thicker veins including the mineralised lodes dip in the opposing direction to bedding at intermediate to high angles and often have associated footwall and hanging wall faults/fractures.

These relationships indicate brittle structure developed late relative to folding, although during the same tectonic event since reverse faulting and folding are crustal shortening processes. This is consistent with Cox (unpublished report) who claims that structural relationships for the central Victorian Ordovician sequence show that initial shortening has occurred by folding and cleavage development with the propagation of reverse faults late during fold growth.

It can subsequently be inferred that auriferous Belltopper Hill lodes also developed within reverse faults. Zones of dilation are developed where refraction of reverse faults across folded strata causes local fault orientation to be inclined to the bulk displacement direction. (Figure 9). This fault refraction is evidenced by the relatively shallowly dipping Panama and West Panama lodes.

Vein geometries of this type are also important gold producers at

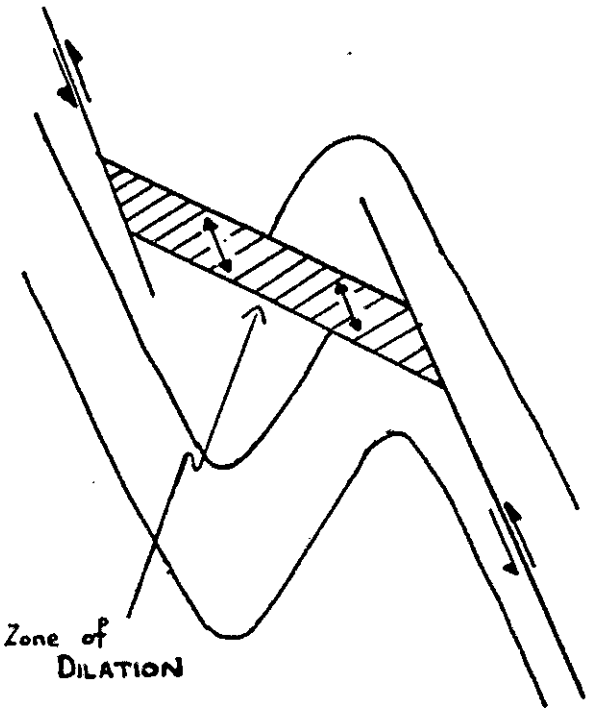


Figure 9. Cross-section through folded stratigraphy showing development of a (reverse) fault controlled dilational zone. (After Cox, written comm.)

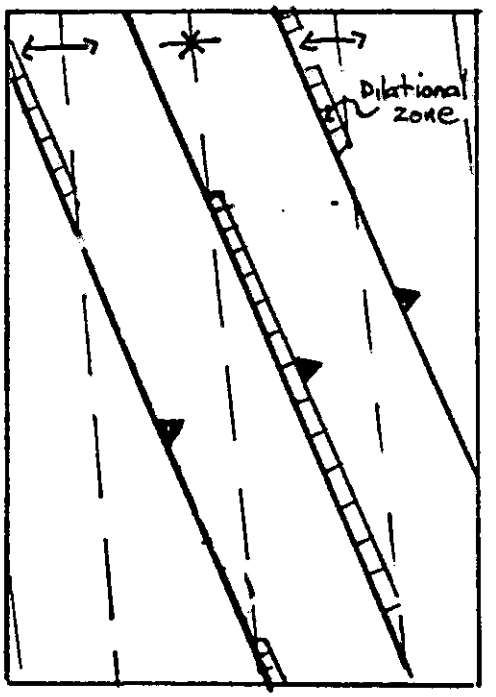


Figure 11. Hypothetical plan showing development of dilational zones when the fault cross-cuts bedding.

Ballarat East, Chewton and Daylesford, (Cox, 1984). Bedding parallel faults probably related to flexural slip during folding were non-dilatant zones and therefore remained relatively impermeable to mineralising fluids at Belltopper Hill. These are important at Ballarat West and Bendigo gold fields which may reflect greater intensity faulting at the latter locations. Narrower vein systems which show quartz crystal growth normal to the vein wall have been generated in extension fractures which have developed in response to faulting.

This structural model has significant economic implications. At Belltopper Hill, the east dipping mineralised lodes will pinch out when a fold hinge is crossed and the fault structure becomes bedding parallel. However, due to the lodes striking at oblique angles the model requires modificatons. Where the mineralised structure intersects the fold axial plane, the structure will adopt an intermediate plunge therefore restricting the geometry (dimensions) of the lode at depth (Figure 10). These cross-cutting relationships between folds and lodes will also restrict the strike development of the latter (Figure 11). Zones of extensive dilation which are favoured sites for gold mineralisation will consequently have specific strike and plunge limitations. This relationship is probably evidenced in DDH MA1 where a fault and only minor mineralisation were recognised along the Missing Link lode projection (Figure 3a).

Post mineralisation deformation is indicated by brecciation of some veins which may mechanically liberate the gold and concentrate it in these latter structures.

Gold-quartz vein deposits in Central Victoria were synchronous with regional deformation and associated low-grade metamorphism of the Ordovician sediments in the middle Devonian Tabberabberan Orogeny. (Cox, 1984). These timing relationships and the lack of extensive wall rock alteration attest to (mineralising?) fluids being evolved from the regional metamorphic event. It is not possible however to predict if the gold was liberated from the sediments during the Orogeny, or derived from another source.

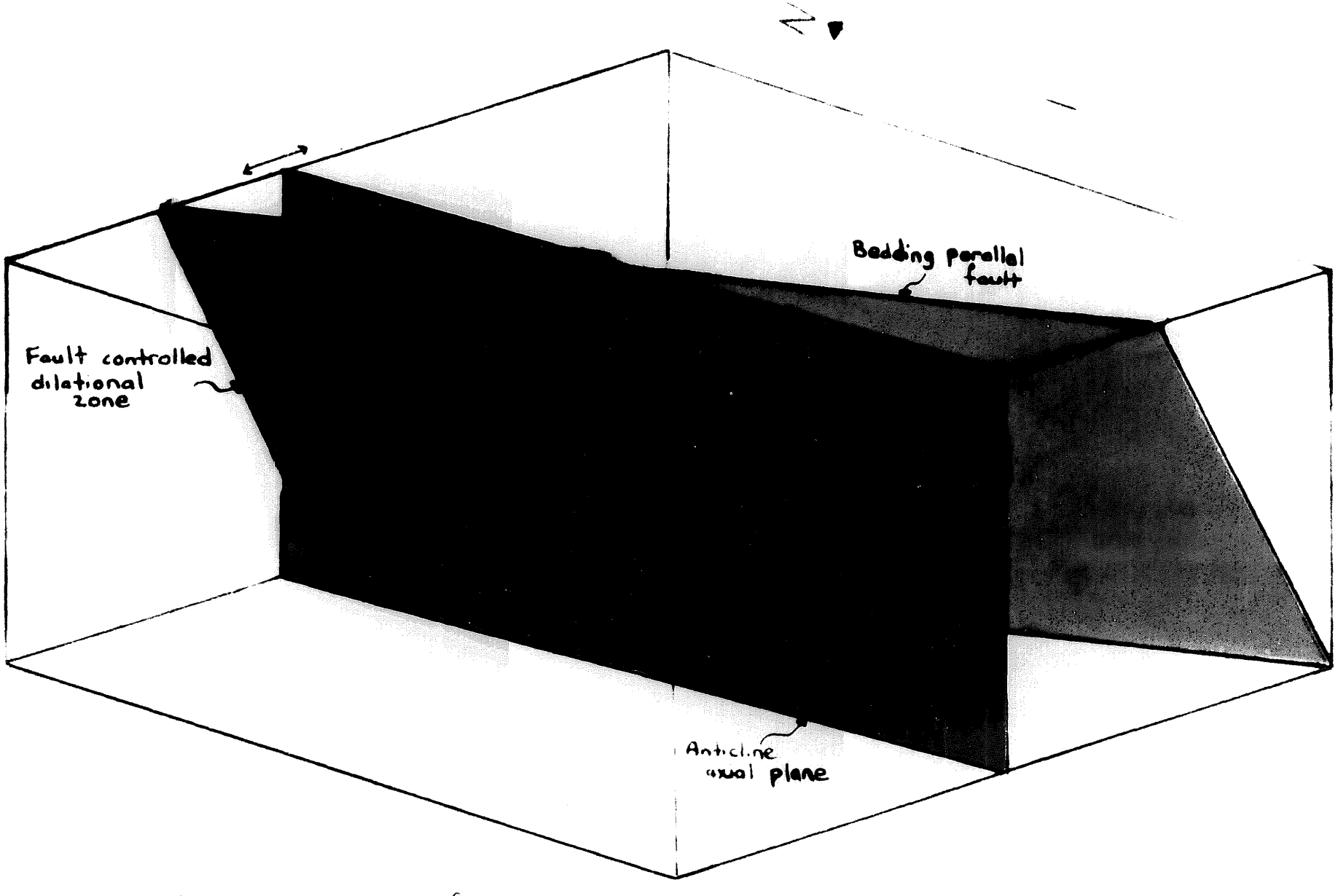


Figure 10. Isometric view of the structural relationships at Belltopper Hill showing the intermediate plunge of the dilational zone as it intersects the fold axial plane

Fluid inclusion studies did not reveal a specific style of mineralisation that could explain the relatively high stibnite content of the veins, however the enriched CO_2 content is typical of metamorphic fluids. (Wall, written communication). Further, the fluid-vapour homogenisation temperatures are consistent with Greenschist metamorphism.

7. CONCLUSIONS

A diamond drill test program, underground geologic mapping and preliminary fluid inclusion studies indicate:

1) Gold and stibnite mineralisation is located in fault controlled dilational quartz veins. Footwall and hanging wall faults may contain gold liberated from post-mineralisation deformation.

2) Lode structures are developed when discordant to bedding but will pinch out along strike and down plunge when intersecting a fold axial plane to become bedding parallel.

3) Lithology type would represent another mineralogical control in that brittle structures propagate more readily in psammitic units. A graphitic component in the host rock would enable fluid reduction causing a decrease in the stability of gold (-bisulphide?) complexes and therefore facilitating gold deposition.

4) Ore developments above the Panama and Missing Link Adit levels are largely mined out.

5) Mineralised structures are narrow. This may be partially explained in the drill core by the incorrect positioning of drill holes with reference to the more recently developed structural model of mineralisation.

6) Geochemical analysis of selected drill core intervals returned low gold values.

7) Low grade gold values in relatively narrow structures would necessitate considerable strike and plunge construction of the lodes assuming they do not have economic alteration.

8) Mineralising fluids do not appear to have evolved from a local source which may have constrained exploration targets.

9) Future exploration should be directed at determining:

i) favourable sites for fault controlled dilational zones and;

ii) stratagraphic horizons most suitable for fracture propagation and gold deposition.

8. RECOMMENDATIONS

Continued exploration of PAL 19 is warranted to apply the mineralised, dilational structure model in search of favourable locations which may host economic gold mineralisation. Historic mine workings previously thought to have been alluvial operations are now considered to have involved primary gold sources. This increases the strike length potential of mineralised, fault controlled, dilational structures.

It is proposed to:

1) Complete detailed geological mapping of the Panama and Missing Link structures and projections.

2) Conduct detailed mapping of sub-parallel structures including the Leven Star Lode.

3) Consider observed structures and lithological distribution in terms of the "mineralised dilational" model.

4) If considered warranted, design a drilling program to test for economic mineralisation.

9. REFERENCES

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Appendix ii

Mineralogical Report (No. 4974)

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MINERALOGICAL REPORT NO. 4974

2nd April, 1987

TO:	Mr. M.K. MacLennan Paringa Mining & Exploration Co. P.L.C. (Molopo Australia Ltd.) 33rd Floor, B.H.P. House 140, William Street MELBOURNE VIC. 3000
YOUR REFERENCE:	Order No. 1457 Your letter dated 16/3/1987
MATERIAL:	Core and Rock Samples Malmsbury Vic. Project
IDENTIFICATION:	MAP 001 to MAP 006
WORK REQUESTED:	Thin and polished section preparation, and report with particular comments on alteration mineralisation
SAMPLES & SECTIONS:	Returned to you with this report

PONTIFEX & ASSOCIATES PTY. LTD.

COMMENTS

The six rocks submitted are described from thin section, and the sulphides in MAP 004 and MAP 005 from polished surfaces. Particular attention is given to alteration as requested.

Samples MAP 001 and MAP 006 are porphyries of dacitic (tonalitic) composition, conceivably representing dykes or high-level (?small) intrusives. They have been modified by hydrothermal clay-sericite-carbonate alteration, with rare pyrite.

Samples MAP 002 to MAP 004 are pelitic-sandy sediments in which the intergranular matrix has been hydrothermally altered as follows:

MAP 002	to fine biotite, rarer fine quartz, sericite, trace carbonate;
MAP 003	to very fine carbonate, diffuse quartz micromosaic, and micas;
MAP 004	has sequence of wall rock alteration zones conformable to the margins of a quartz vein. The vein has an inner selvedge of albite, a thin outer alteration selvedge of concentrated sericite; then a wide zone of silicification + arsenopyrite and minor sericite; gradational into an outermost zone of intergranular fine sericite-biotite-quartz-carbonate, and containing more pyrite than arsenopyrite.

Sample MAP 005 is a fine muscovite-rich shale, with laminae of fine carbonate, scattered pyrite and arsenopyrite, probably representing a hydrothermal alteration/mineralisation zone.

Trace extremely fine chalcopyrite occurs in MAP 004 and MAP 005. One crystal of galena + sulphosalt occurs in the quartz vein in MAP 004. Trace minute inclusions of pyrrhotite and a ?sulphosalt occur in two crystals of arsenopyrite in MAP 005.

MAP 001 (Biotite), plagioclase-porphyritic dacite or tonalite porphyry; fairly extensive clay-sericite and carbonate alteration of plagioclase and biotite; trace pyrite.

This is an altered porphyry, similar to MAP 006. Phenocrysts consist of euhedral plagioclase crystals (about 25 % of the whole rock), rounded quartz crystals (2-3 %), all with an average size of 3 mm; also microphenocrysts of biotite (10 %), average size 1 mm.

The plagioclase phenocrysts are locally clustered, and very extensively altered to very fine clay-sericite and subordinate carbonate. The biotite phenocrysts are completely altered to muscovite, and carbonate, clouded with extremely fine titaniferous oxides.

These components are randomly disposed through a groundmass of quartz-plagioclase mosaic, grainsize of 0.3 mm, with minor scattered fine biotite. The groundmass plagioclase shows relatively moderate argillic alteration, and the biotite more extensive sericite-carbonate alteration.

Trace very small cubes of pyrite are present, and a barren quartz vein cuts the rock.

MAP 002

Weakly bedded, gritty, very coarse (feldspathic) quartz sandstone; extensive matrix of finer detrital quartz, hydrothermal and/or metasomatic biotite, and lesser secondary quartz.

This is a weakly bedded to massive, fairly homogeneous sediment. It is dominated by a very loosely packed aggregate of subrounded to rounded quartz grains (50-60 %), weakly altered plagioclase grains (10 %), and rare lithic detritus, all with a grainsize of 0.5 to 3 mm, average about 1.5 mm. About one half of the quartz grains are single-crystal, and the other half of them are polycrystalline, due to recrystallization at their source.

The matrix filling the space between these grains, and tending to form thin, very poorly defined beds, consists largely of fine quartz sand grains which themselves have an extensive intergranular matrix of fine biotite, rarer sericite and secondary 'cherty' quartz, disseminated leucoxene and trace carbonate.

The biotite is mostly random, locally weakly schistose, and together with the secondary fine quartz, appears to have formed by hydrothermal-alteration (or metasomatic) agencies.

MAP 003

Massive and predominantly medium-grained sandstone; extensive pelitic matrix, and generally finer, intergranular, hydrothermal (?metasomatic) quartz, micas and carbonate; veins of coarse prismatic quartz + rare carbonate.

This is a massive sediment composed of an intricate mixture of roughly three different components:

1. 30-40 % detrital subangular to subrounded quartz grains, and rarer plagioclase, 0.15 to 0.6 mm size;
2. 40 % less clearly defined detritus, essentially as a matrix to these quartz grains, about 0.1 mm size, including quartz, fine (detrital) micas, gradational into:
3. 20 % ubiquitous, even more poorly defined and commonly finer, carbonate, sericite, localised biotite, vague cherty quartz, and leucoxene, which may be partly low-grade metamorphosed detritus, but appears to be mostly due to 'hydrothermal' (?metasomatic) alteration, which has extensively permeated the intergranular areas of the original sediment.

A vein of coarse prismatic quartz, incorporating minor drusy vugs, and rare carbonate cuts the rock, but there is no increase in, or different style of, alteration adjacent to the vein margins.

Rare trace minute grains of pyrite occur in the sediment.

MAP 004

Vuggy quartz vein + trace pyrite, inner selvedge of albite, and carrying rare crystals of arsenopyrite and of galena + sulphosalt. Zones of alteration within sediment matrix, in order, away from the vein are:

1. concentrated sericite;
2. silicification + arsenopyrite, minor sericite;
3. fine sericite, biotite, carbonate, with more pyrite than arsenopyrite.

One end of this core sample is a vein of coarse prismatic quartz crystals, incorporating minor vugs and trace very fine pyrite. This vein has an internal selvedge, about 1 mm wide, against its contact with the host rock, of euhedral albite crystals based on the contact and growing into the vein-quartz.

Immediately on the other side of the contact, also for a width of about 1 mm, there is a wall rock alteration selvedge, albeit discontinuous, of relatively very concentrated sericite.

On the outer side of this sericite selvedge, for a width of at least 15 mm into the rock, is an alteration zone, conformable with, and related to, the vein, dominated by diffuse 'cherty' secondary quartz carrying minor scattered sericite (or fine muscovite). This is hydrothermal alteration which replaces the original sediment matrix, with residuals of original detrital quartz sand grains (50 % of the band), now incorporated in the new silicification.

One coarse crystal of galena, and one crystal of arsenopyrite, occur actually in the quartz vein. The galena has minor inclusions of a sulphosalt (?probably Ag-Pb-rich).

Numerous euhedral crystals of arsenopyrite, about 3 mm size, are randomly disposed through this silicification/alteration band; very small prisms and needles of rutile (derived from groundmass leucoxene?) are also scattered, and some occur as inclusions in arsenopyrite.

MAP 004

Vuggy quartz vein + trace pyrite, inner selvedge of albite, and carrying rare crystals of arsenopyrite and of galena + sulphosalt. Zones of alteration within sediment matrix, in order, away from the vein are:

1. concentrated sericite;
2. silicification + arsenopyrite, minor sericite;
3. fine sericite, biotite, carbonate, with more pyrite than arsenopyrite.

One end of this core sample is a vein of coarse prismatic quartz crystals, incorporating minor vugs and trace very fine pyrite. This vein has an internal selvedge, about 1 mm wide, against its contact with the host rock, of euhedral albite crystals based on the contact and growing into the vein-quartz.

Immediately on the other side of the contact, also for a width of about 1 mm, there is a wall rock alteration selvedge, albeit discontinuous, of relatively very concentrated sericite.

On the outer side of this sericite selvedge, for a width of at least 15 mm into the rock, is an alteration zone, conformable with, and related to, the vein, dominated by diffuse 'cherty' secondary quartz carrying minor scattered sericite (or fine muscovite). This is hydrothermal alteration which replaces the original sediment matrix, with residuals of original detrital quartz sand grains (50 % of the band), now incorporated in the new silicification.

One coarse crystal of galena, and one crystal of arsenopyrite, occur actually in the quartz vein. The galena has minor inclusions of a sulphosalt (?probably Ag-Pb-rich).

Numerous euhedral crystals of arsenopyrite, about 3 mm size, are randomly disposed through this silicification/alteration band; very small prisms and needles of rutile (derived from groundmass leucoxene?) are also scattered, and some occur as inclusions in arsenopyrite.

MAP 004 cont.

The outer margins of this arsenopyrite-siliceous alteration zone grade into the host rock which has an intergranular matrix altered to extremely fine micas and carbonate with rarer quartz, as in MAP 003. Minor crystals of arsenospyrite occur in this zone, small crystals of pyrite and networks of pyrite are scattered and slightly more abundant than the arsenopyrite. Trace blebs of chalcopyrite also occur in this outer zone.

In summary, the vein and wall rock alteration sequence is:

1. vuggy quartz vein + rare pyrite, arsenopyrite, galena + sulphosalt;
2. inner selvedge of albite;

Contact

---

3. narrow outer selvedge of concentrated sericite;
4. wide zone of extensive silicification + minor sericite, also scattered arsenopyrite (and rutile), grades into
5. outer zone of intergranular, very fine sericite, biotite, carbonate alteration; less quartz than in 4., more pyrite than arsenopyrite.

MAP 005

Fine muscovite shale; laminae of extremely fine carbonate, scattered pyrite and arsenopyrite, probably part of an alteration/mineralisation zone, but not necessarily specifically related to the quartz vein in this rock, trace chalcopyrite and ?sulphosalt.

This is a much finer and more homogeneous sediment than MAP 002 to MAP 004; it is a shale, with no quartz. At least 80 % of it consists of sericite (fine muscovite), which is strongly schistose, albeit with a superimposed conjugate set of flakes criss-crossing the dominant apparent primary (S_1) cleavage.

Variably continuous laminae of extremely fine carbonate occur along the main foliation and in vague patches, to form about 10 % of the rock. It is not certain if this carbonate is a metamorphically recrystallized indigenous component, or whether it (and indeed some of the fine muscovite) represents hydrothermal alteration (as the same minerals in other sediments represent). The presence of minor stringers of fine carbonate, and of scattered arsenopyrite, suggest the latter genesis.

Pyrite (5-7 %) occurs as diffuse microporous 'grains' about 0.2 mm size, and numerous clusters of these to 3 mm, vaguely scattered along the main foliation. Rarer arsenopyrite crystals (2-3 %), less than 1 mm size, are also scattered. These sulphide crystals are essentially authigenic, but probably part of an alteration/mineralisation event, adjacent to quartz veining. A short vein of relatively euhedral pyrite crystals and one arsenopyrite crystal cuts across the foliation; another pyrite stringer has trace sphalerite and chalcopyrite.

A vein 10 mm wide, of coarse prismatic quartz, enclosing rare carbonate crystals and rare vugs cuts this rock, but without any distinctive wall rock alteration which can be directly related to it as in MAP 004. This vein does carry accessory fine pyrite, and accessory small muscovite flakes along its inner margins.

MAP 005 cont.

Rare, extremely small grains (0.03 mm) of chalcopyrite occur in the vein and scattered through the adjacent rock. Rarer, smaller (0.01 mm) inclusions of pyrrhotite, chalcopyrite, and a strongly anisotropic apparent sulphosalt (?Sb, As, Pb or Ag-rich) occur in some of the arsenopyrite crystals.

MAP 006

Biotite-quartz-plagioclase microporphyritic dacite (or tonalite porphyry); advanced sericitic alteration ± clays, accessory pyrite.

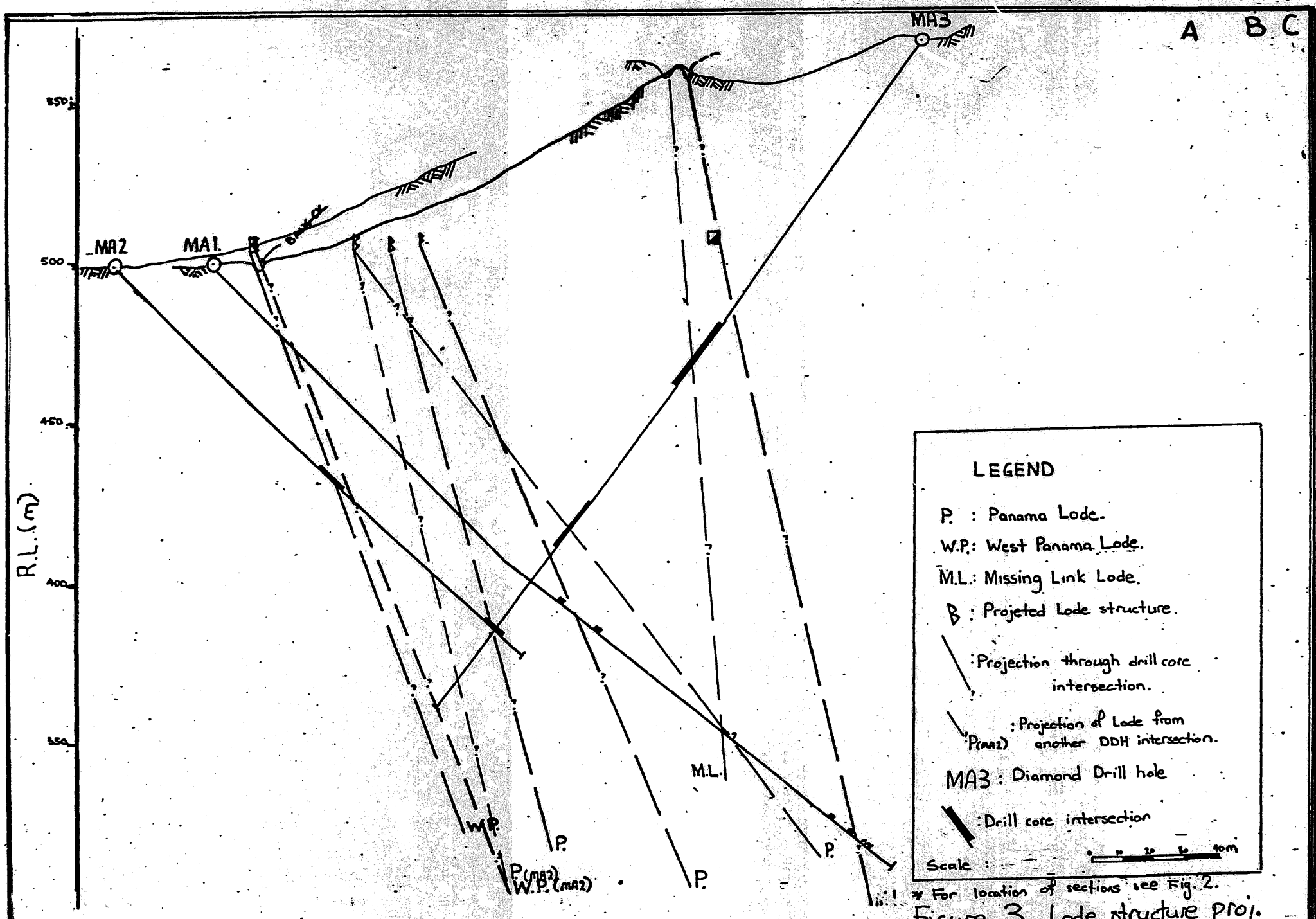
This is a porphyry, similar to MAP 001, but with far more abundant quartz phenocrysts. Phenocrysts of 1 to 2.5 mm size consist of:

subrounded quartz crystals	10-15 %
altered plagioclase, locally clustered	10-15 %
altered biotite	10 %

The plagioclase phenocrysts are mostly, almost completely altered to clay-sericite, and the biotite is extensively altered to muscovite, with the consequent release of extremely fine titaniferous grains. This alteration appears to be essentially hydrothermal, but accentuated by weathering. The carbonate alteration seen in MAP 001 does not occur in this rock.

The groundmass consists of a fairly homogeneous micromosaic (0.15 mm size) of quartz, weakly altered plagioclase, with minor scattered fine altered biotite.

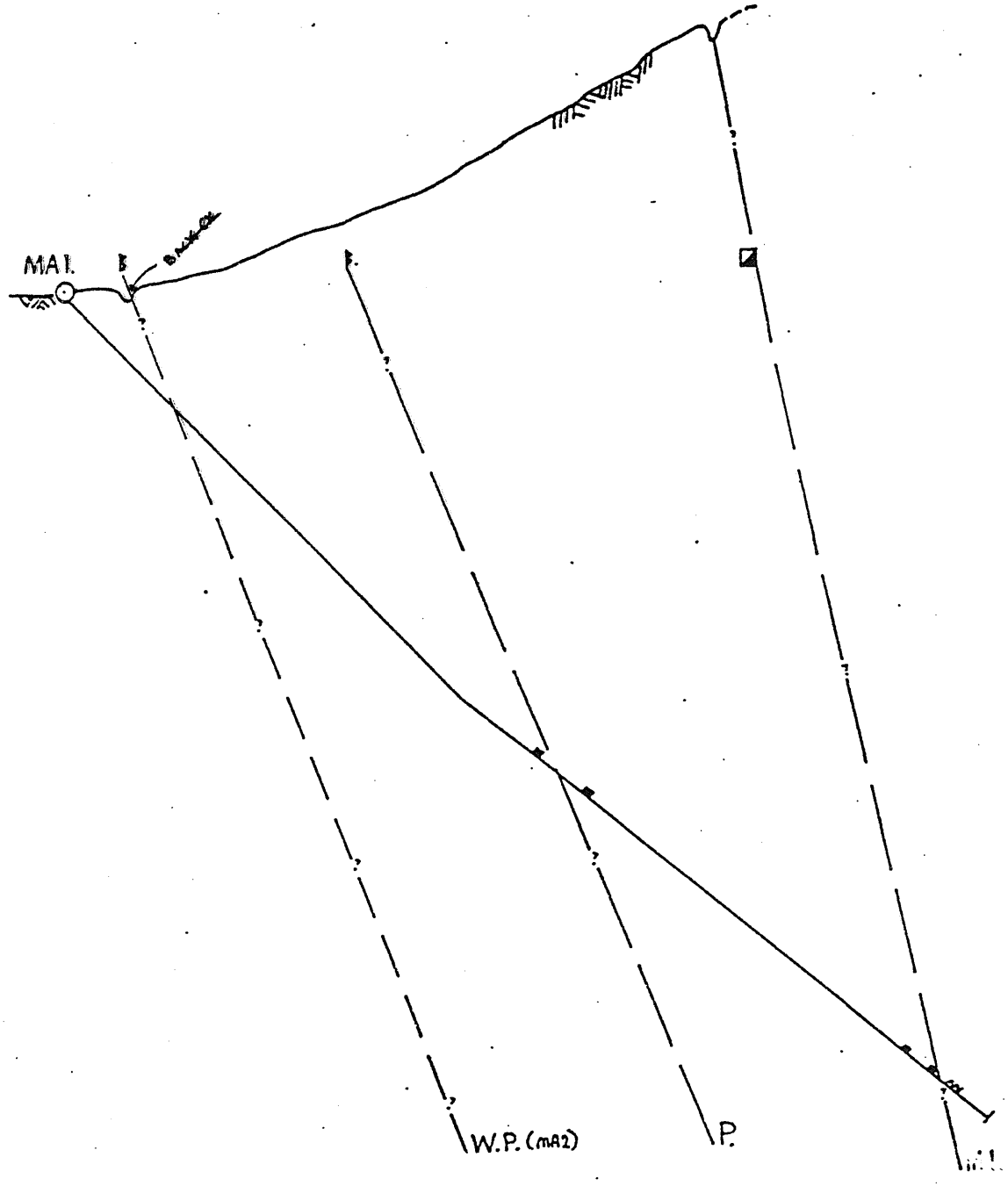
Accessory cubes of oxidised pyrite are scattered.



* For location of sections see Fig. 2.

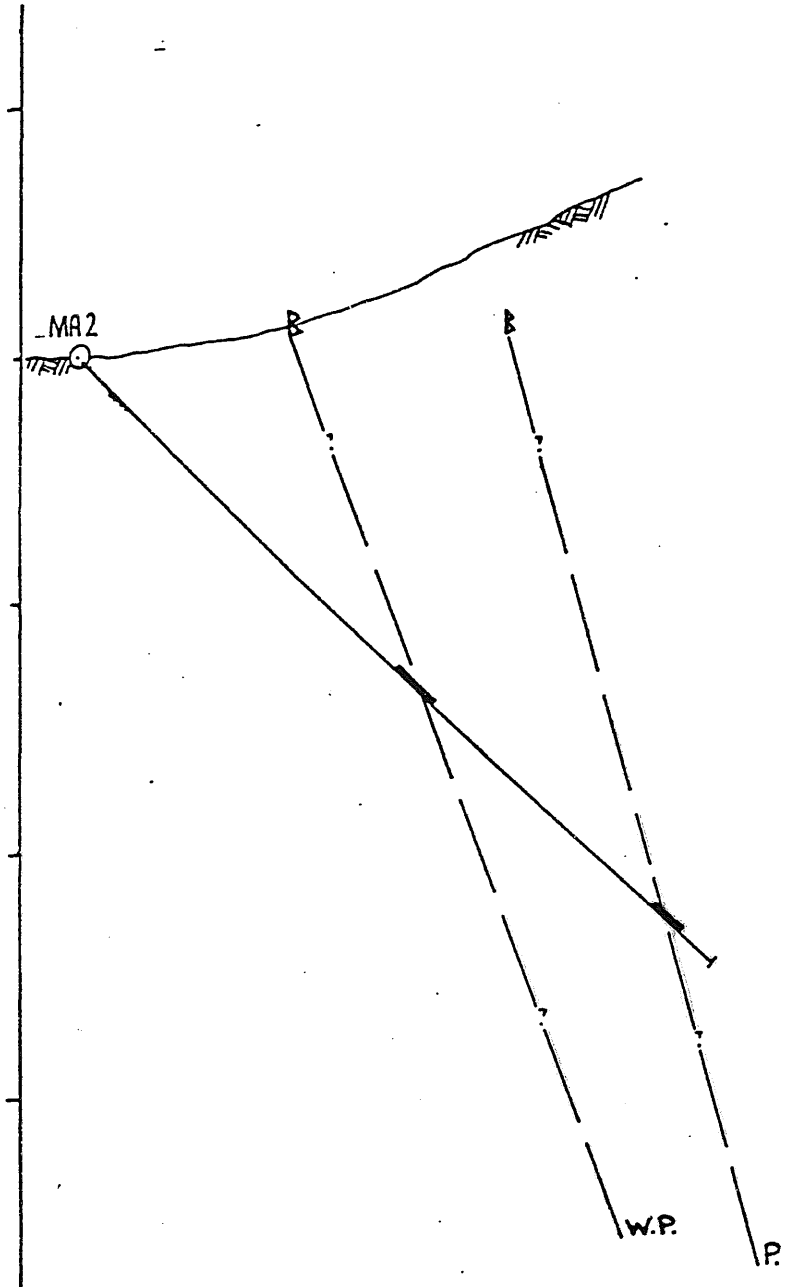
Figure 3. Lode structure proj.

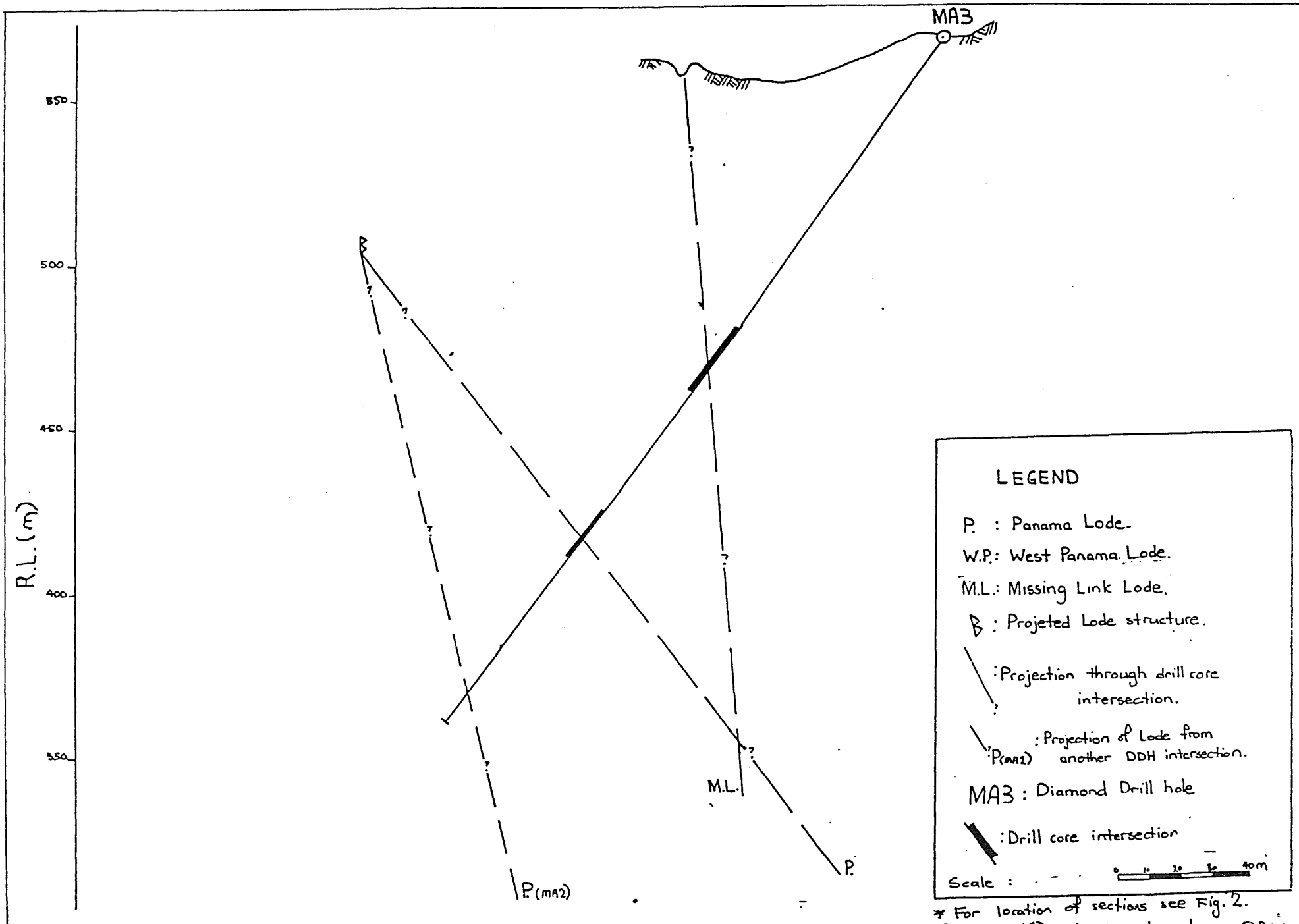
A



(47)

B





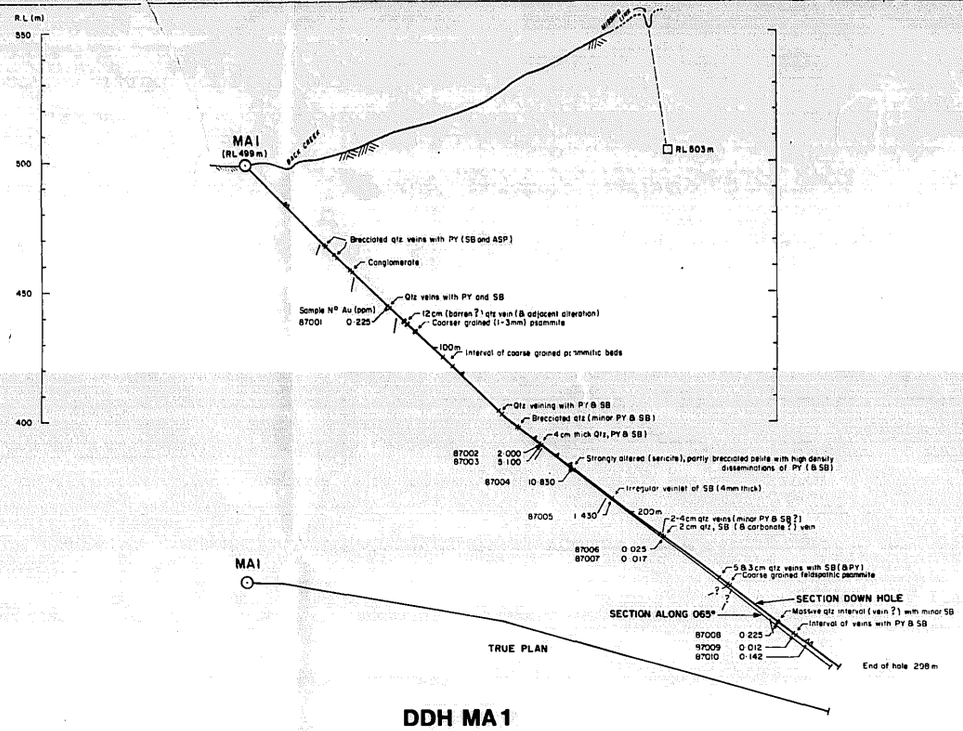
* For location of sections see Fig. 2.

Figure 3. Lode structure proj.

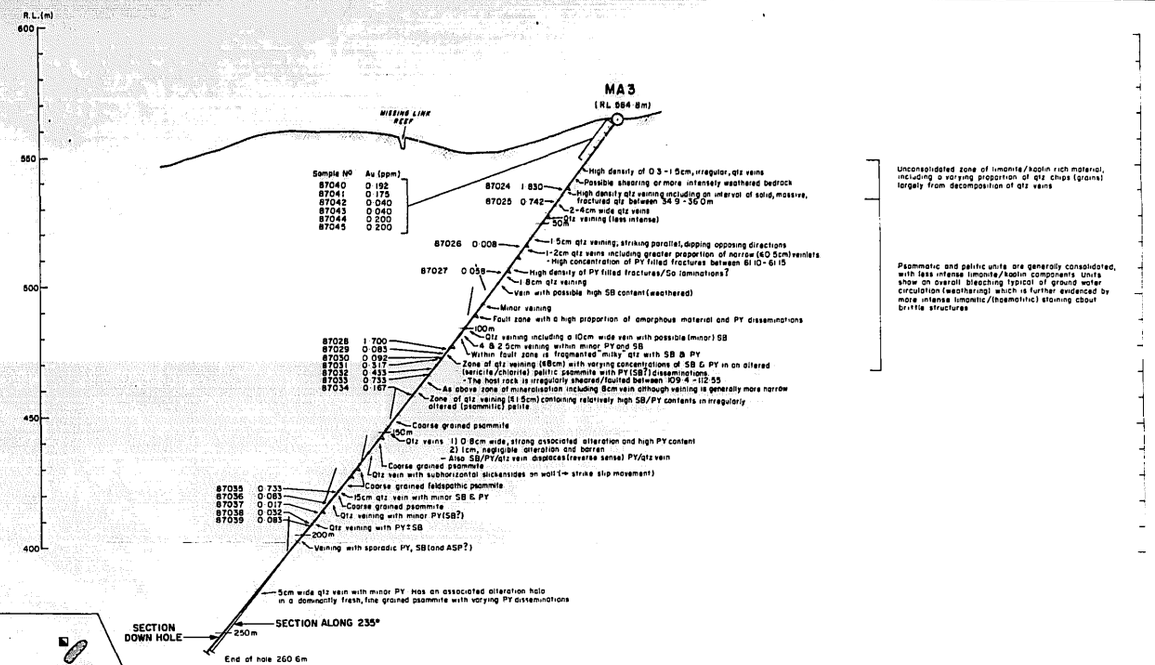
148

PAL 19

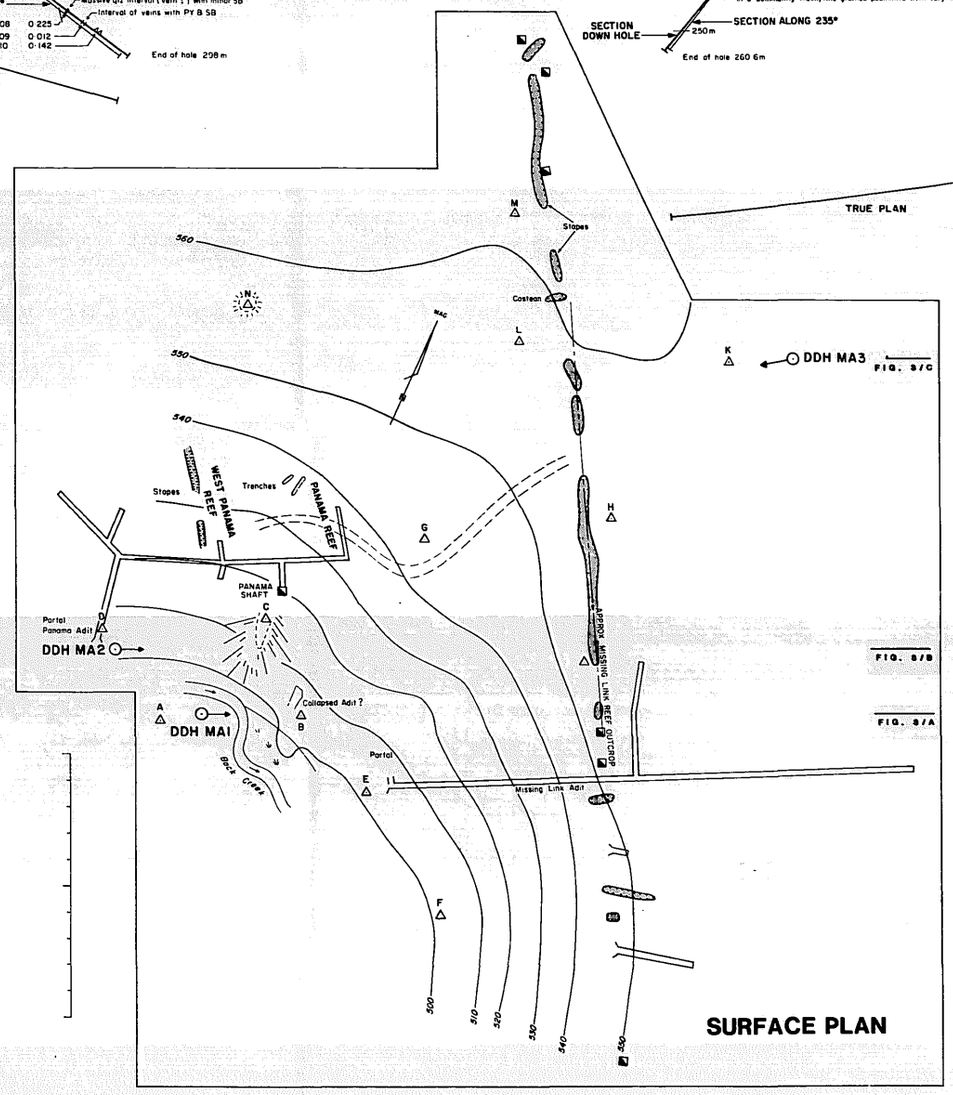
FIG 2

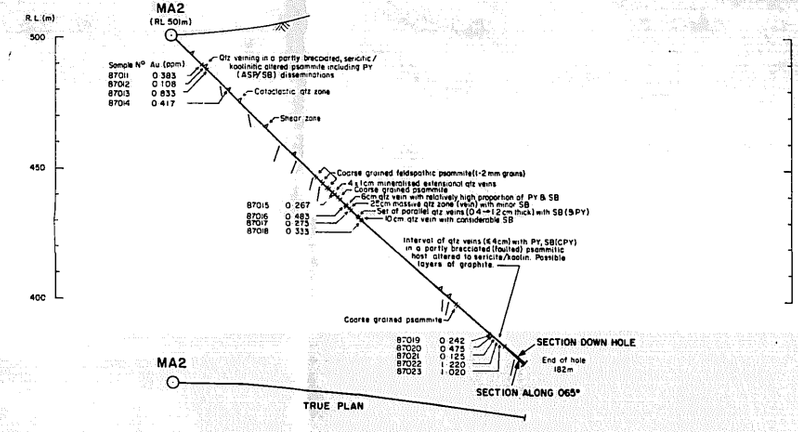


DDH MA1



DDH MA3





DDH MA2

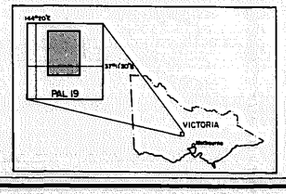
LEGEND

- Bedding (assuming the steeper dip of two possible orientations)
- Breccia
- Contour (m)
- Survey station
- Drill hole collar
- Dump
- Trench, stope, costean
- Portal of adit
- Shaft
- Swamp
- Track

Abbreviations

Qtz	Quartz
PY	Pyrite
SB	Stibnite
CPY	Chalcopyrite

LOCATION MAP



HOLE MA1

Co-ordinates
R.L. 499m
Total depth 298·6

DOWN HOLE SURVEYS

Depth (m)	Bearing	Dip
43·0	074	-44
239·6	080	-37
296·0	081	-37

HOLE MA2

Co-ordinates
R.L. 501m
Total depth 182·3

DOWN HOLE SURVEYS

Depth (m)	Bearing	Dip
75·0	069	-44
124·0	071	-42
154·0	072	-41
179·3	072	-40

HOLE MA3

Co-ordinates
R.L. 564·8
Total depth 260·65

DOWN HOLE SURVEYS

Depth (m)	Bearing	Dip
78·1	235	-55
143·0	237	-52
197·35	237	-50
254·65	239	-48·5

MOLOPO AUSTRALIA LIMITED

MALMSBURY GOLD PROSPECT: PAL 19

DIAMOND DRILL HOLES MA1, MA2, MA3

GEOLOGIST M.K. MacLennan
DRAUGHTSMEN Romp Drafting & Cartography Pty. Ltd.
DATE
SCALE 1:1000
0 10 20 30 40 50 60 Metres

REVISIONS	DATE	APPROVED

PLAN No
FIGURE 2

FIG. 2

PAL 19

PAL 19

STOPE

4cm vein and adjacent fault traced along eastern wall to end of drive (backfill)

Set of planar veins (≤ 5cm). Appear to have been mined since the footwall surface is the stope wall. Spatially associated with above zone are tension veins at high angles (73W)

1cm vein/fracture

5 – 10cm qtz vein, (minor 'bulk sampling')

5 – 15 cm vein coarse qtz along walls, massive interior

Planar 2cm vein

Probable fault zone with a strong penetrative cleavage and parrallel qtz veinlets (≤ 3mm)

15 – 20cm section of the thick qtz vein (reef) which has been recognised along the western wall. Shows some tensional qtz growth (→ Missing Link = extension?)

Qtz vein surface (steep west also)

1·5cm vein is displaced (strike slip ?) by fracture

1cm vein (→ fracture) : 57W

Zone of qtz stringers

Between 26·3 → 33, thick (10 – 20cm) qtz zones observed near base of the western wall. Between 32 – 33 qtz actually been mined. Probably associated to the prominent qtz vein structure (reef)

Steep (vertical) fault 3 – 4 cm wide

10 cm qtz vein which divides down dip possibly due to adjacent fault (above)

3cm wide, tension vein

So ?

Backfill

Displacement (1cm) of 70w by 23ne – normal

Fault pinches out to approx. 4cm at end (north) wall.

Fault surface shows limonitic staining

1cm vein width associated fault gauge

Backfill (mullock)

Fault is 12cm showing a strong penetrative cleavage, parrallel to the fault

Zone of relatively intense qtz veining

Fault zone consisting of soft, fine grained, (unconsolidated) grey clay. Incl. minor qtz. veinlets.

Backfill

3cm qtz vein diverges up dip

Reorientation of fault zone possibly due to convergent qtz veins (zone)

So? or strong penetrative cleavage?

Zone of highly deformed laminated pelite (= soft sediment deformation?) Has overall west dip. → Crossed synclinal hinge (?)

2 – 3cm vein with adjacent fault zone(s)

2 – 4 cm qtz vein

5 – 10cm fault comprising limonitic stained, soft unconsolidated clay material. Truncates a 2cm vein (82W)

Pelite showing strong slatey cleavage (laminations ?)

(So?)

Vein (11cm) pinches out down dip

Planar, veinlet with visible PY

1 – 2 cm vein

1 – 6cm qtz vein, irregular down dip with abundant PY. Is displaced (normal) by 4cm wide fault (50W)

Set of qtz veinlets

1 – 4 cm vein with PY and SB. This may cross-cut 86E

3 – 4 cm qtz (tension) vein with high PY content

Fault intersects floor as diverges away from drive

Mining of the western wall reveals thick 5 – 15cm (pinch/swell) fault. May represent footwall fault of (truncated) vein.

Thick vein appears truncated (displaced ?), possibly due to 3cm vein (59W)

At 8m, qtz vein (reef ?) is 15cm wide with associated 1 – 2cm hanging wall fault. Structure "rolled → east" since 5m

Intersection between 6cm (80s) vein and western wall vein" forms wider (11cm) qtz zone

Qtz vein (8cm) along western wall shows PY + SB mineralisation

As qtz vein(s) and fault zone diverge host rock is less deformed

Prominent qtz zone including multiple veins which reorientated when converging to fault zone

Irregular qtz vein displaces 1cm wide fault 10cm – reverse

Prominent laminations (/cleavage?) in pelitic unit, shallows to the east

No scale implied

Set of qtz filled tension fractures related ? to W dipping vein

End wall (→ north)

Laminated pelite

3cm qtz vein which appears to divide

10cm qtz vein with relatively high PY component

10cm qtz vein. Pinches out down dip

Concentrated zone of qtz veins (from west wall) at end wall ~ 20cm wide ~ 70 e ? 50. So laminations (?) "dragged" between veins

3 thick (4 – 8cm) qtz veins along wall, are generally irregular

5 – 8 cm vein on walls of drive

3 – 4 cm qtz zone cross-cuts 59E

5 – 6 cm qtz vein

1cm vein is displaced 3cm (reverse) by 39E

Fracure (35W) cross-cuts (72E vein

3cm vein (72E) pinches out

Zone of high density veining

(72W) vein "reverse dragged" through set (80NE)

Minor sub-horizontal veinlets terminated at this (69W) vein; tension fracture fills ?

2cm planar vein (+SB ?) shows "normal sense" drag (ductile deformation) when cross-cutting 49NE vein

Planar fracture (+2mm) veinlet

1cm qtz vein

8cm – 4 cm pinch and swell vein

Planar 5cm thick qtz vein with sub-vertical slicken sides in fault gouge walls + SB

Prominent, planar 3cm wide vein with coarse qtz fibres normal to vein wall (→ extension). Cross-cuts vertical veinlet on north wall and a 1cm (73W) vein on roof

2 parrallel qtz veins → join → diverge down dip

2 – 3 cm vein

Fracture displaces veinlet

Veinlet is displaced 1cm by another (fracture)

Possible 1cm wide fault zone is cross-cut by adjacent west dipping veins

1 cm vein (below) reorientates

Set of parrallel veins. 2 prominent; 1 and 4 cm

So or Si cleavage ?

Vein divides down dip

Appears to cross-cut I

vein which divides and rejoins down dip } Both appear to cross-cut III

MAG.

1·5cm vein

2 cm vein } down dip 78W deflects into 65W, fracture controlled

15cm irregular vein forming a thicker qtz zone where intersects the E dipping vein (below)

5 – 10 cm vein continuous from northern drive is exposed along the eastern wall, becoming steeper along strike (→ south)

Pinch/swell tension vein which can be traced to end (north) wall (above section diag.). Changes dip direction ("rolls") along strike

3 – 4 cm qtz vein forming part of the western wall

STOPE

3 cm vein, irregular down dip on south wall. Cross – cuts : 74s vein/fracture(s)

2 – 4 cm irregular qtz vein

Low density veining

Concentrated zone of (parrallel) planar veining, 0·4 – 1·5 cm wide

1 – 2cm wide vein with PY (+SB?) mineralisation. Cross-cuts ~ fault zone (79w). Veining and associated alteration relatively intense

Veinlet possibly cross-cuts above vein

2 parrallel 0·5 – 1 cm veins

zone parrallel to bedding

cross-cut qtz zone (below)

of multiple veins in irregularly developed

ngle on north wall

z zone

cent hard rock consists of relitic material

Finely laminated with PY

ows

0 cm of

ot

MOLOPO AUSTRALIA LIMITED

MALMSBURY GOLD PROSPECT: PAL 19

MISSING LINK ADIT AND DRIVE RL = 503m

GEOLOGIST M.K. MacLennan

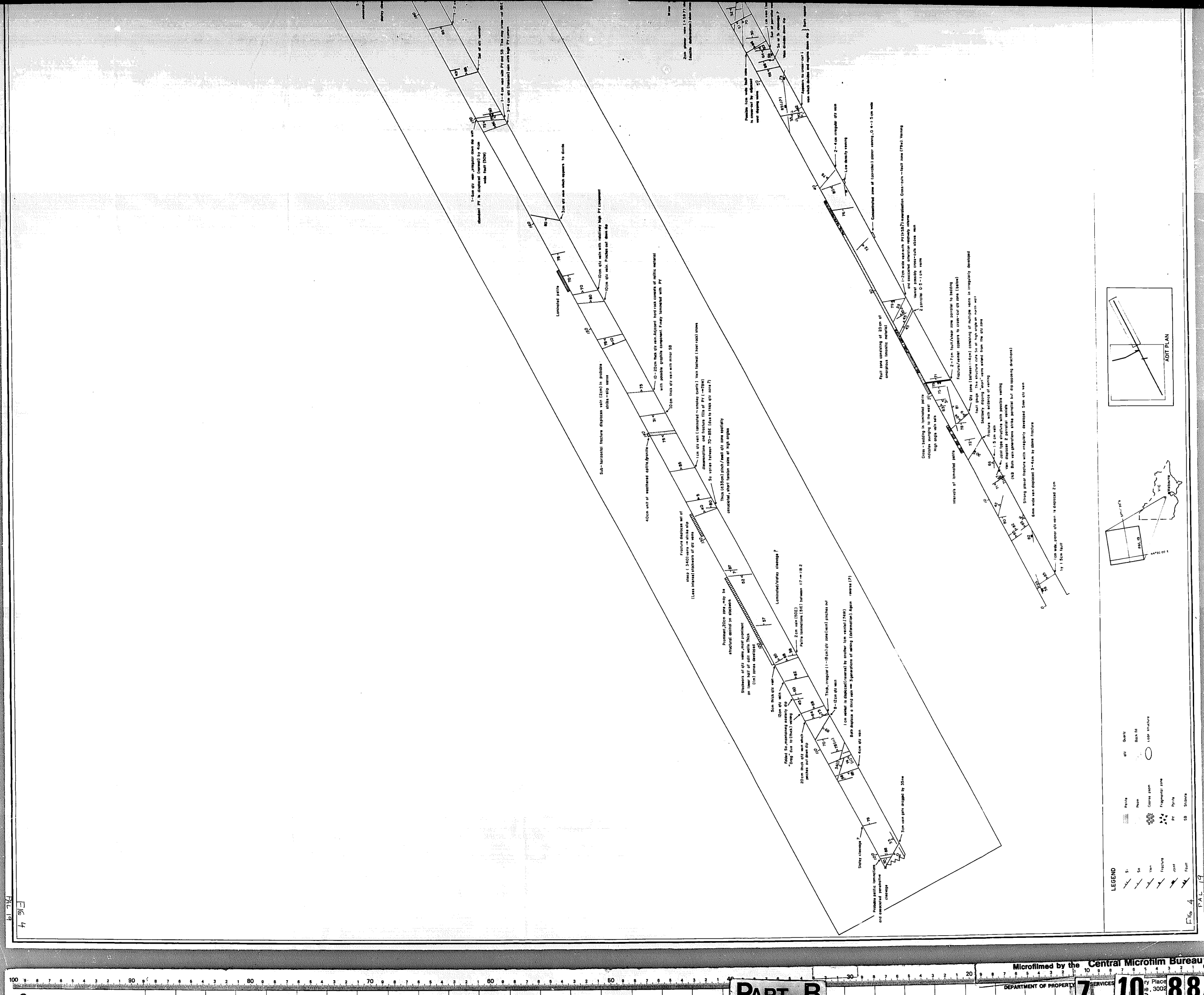
DRAUGHTSMAN Kemp Drafting & Cartography Pty Ltd

DATE March, 1987

SCALE 1:50

0 1 2 3 4 5 6 Metres

REVISIONS | DATE | APPROVED | PLAN No FIGURE 4



PAL 19
FIG 5

WEST WEST PANAMA LODE

15cm chloritic (graphitic?) fault
Minor associated qtz veining

Vein is crosscut by fault (68W) and appears to propagate from footwall fault of (60E) vein

3-9cm (pinch/swell) qtz vein. Mineralization with strong (68cm) associated footwall fault

1cm fault

So parallel

1-2cm zone of fine grained chlorite(?) material May displace (74S) fault (including Py dissemnations in 3-4cm gauge) a REVERSE sense .5cm displacement Fault forms irregular qtz veinlets

2cm fault

Massive 10cm qtz vein with PY mineralization. The vein is dragged by (85W) fracture (REVERSE) and is truncated by (85W) fault (see diagram below)

2-3cm qtz vein, is displaced by fault along eastern wall

Prominent fault 1) pinches out OR 2) gets displaced by high angle fracture (62E)

Approx zone of irregular qtz veining
Fracture dragged through fault

Fracture displaces vein (11E) normal(?) sense

Silicified fracture truncated by (24E) fault on walls

Prominent shallow fault in adit intersects roof

15cm fault consisting of fine grained amorphous material and irregularly developed qtz stringers

NB No scale implied

South View

8cm massive qtz vein truncated by fault

15cm vein truncated by fault

Fault appears to plunge shallowly to the north

Zone of qtz veining (sub) parallel, ≤ 3cm are truncated by fault

Set of qtz veins (83SW) are truncated (pass displaced by fault on western wall.

From 2m to end wall of adit, a fault (23E - 36S) can be traced along western wall (approx partly eastern wall) It varies in thickness between 4-20cm consisting of soft unconsolidated clay with zones of cataclastic qtz. Probably 'pre-fault' vein. Intersects the roof at 35cm in the western cross cut (as shown)

1cm vein displaced by fine fracture

2 parallel qtz veins (approx 1cm wide) displaced by fracture

PANAMA ADIT

7cm wide vein (80N) is displaced 21cm by 3-4cm fault (including minor qtz veinlets)

Zone of fine fracturing and qtz vein(let) stockwork

2cm qtz vein cross cuts 1cm (60W) veinlet

9cm qtz vein

Vein cross cuts (59W) fracture and is also dragged by the latter

10cm vein displaced approx 25cm by fracture

2 parallel, 1cm qtz veins

2cm qtz vein

Backfill from stope

10cm thick planar qtz vein forms western wall of drive

Fracture with ≤ 2mm amorphous fill (Fe stained) Displaces 2cm qtz vein 15cm in REVERSE sense

Western wall appears fault controlled

Eastern wall is fault controlled .5cm wide with minor qtz vein lets

Breccia zone along roof

WEST PANAMA LODE

15cm qtz vein with associated tension gashes

Laminated sands with cross bedding structures

Stockwork of qtz veins (≤ 2cm)

So with plunge recorded

Shallow dipping qtz veins (x 2) and the 14E vein at 45m are displaced 20cm by 74W fracture in REVERSE sense

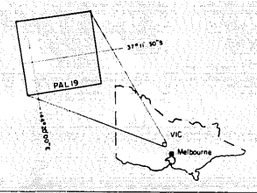
Panama Shaft

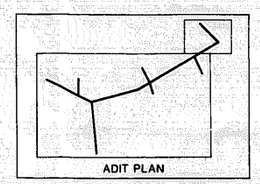
Mag.

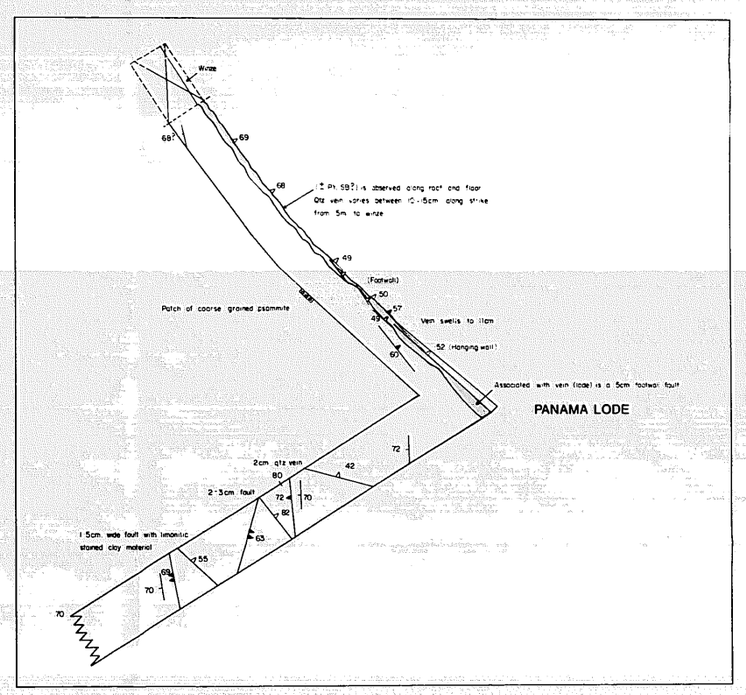
N

LEGEND

Si	Pmte	qtz	Quartz
So	Psam		Backfill
Vein	Coarse psam		Load structure
Fracture	Fragmental zone		
Joint	Py Pyrite		
Fault	Sb Stibnite		







MOLOPO AUSTRALIA LIMITED

MALMSBURY GOLD PROSPECT: PAL 19
PANAMA ADIT, CROSS CUT AND PANAMA, WEST PANAMA AND WEST WEST PANAMA DRIVES

GEOLOGIST	M.K. MacLennan	SCALE	1:100
DRAUGHTSMAN	Kemp Drafting & Cartography Pty. Ltd.		
DATE	April, 1987		
REVISIONS	DATE	APPROVED	PLAN No
			FIGURE 5

PAL 19

Appendix i

Detailed Diamond Drill Hole Logs for Diamond Drill Holes MA1, MA2 and MA3

HOLE NUMBER: DDH MA1 | COMPANY: NICORO AUST. LTD.

LOCATION: MALMSBURY (PAL 19) | 1:250,000 SHEET MELBOURNE | 1:100,000 SHEET CASTLEMAINE

CO-ORDINATES:	
BEARING: 065°	
ATTITUDE: -45°	
REDUCED LEVEL: 499m	
LENGTH: 298.6	
HOLE SIZE: HQ (20.6-371) NQ (37.1-298.6)	

COMMENCED:	6-1-87
COMPLETED:	18-1-87
DRILLER:	P. FALLOON
RECOVERY TECHNIQUE:	WIRELINE
LOGGED BY:	M.K. MACLENNAN

PURPOSE: - Test for depth continuation of mineralisation on Y6 Missing Link Lode
- Test for depth and strike continuation of mineralisation on Y6 Panama (Antimony?) Lode

SURVEY DEPTH (m)	BEARING (mag)	DIP
43.0	074°	-44
239.6	080	-37
296.0	081	-37

SIGNIFICANT INTERSECTIONS

FROM (m)	TO	LENGTH	DESCRIPTION
77.0	77.3	0.30	0.5-2cm thick qtz veins with sporadic PY/SB mineralisation in altered psammite
158.0	158.8	0.80	4 cm veins with irregular deposition of PY/SB. Possibly parallel to bedding.
216.35	217.35	1.00	Strong alteration of psammite with 15cm zone of thick, irreg. veining (Y/SB/Q)
271.45	271.72	0.27	Massive qtz vein with minor SB.

SIGNIFICANT ASSAYS

FROM	TO	LENGTH	WEIGHTED ASSAYS									
See Table 1 (p14).												

SIGNIFICANT CORE LOSS

FROM	TO	RECOVERY m	RECOVERY %
No significant core loss.			

COMMENTS:

Mineralisation at 271.5 and faulting between 281.0 → 281.7 may represent Missing Link Lode structure.

* ALIGN DRILL CORE So SO v S1 strike 355° m
(& intersection lineation is subhorizontal) **DRILL RECORD** Dip ~ 45°

All bearings in magnetic

HOLE NO: DDMA 1

LOGGED BY: M. M^c L. (Analysed by)

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	RECOVERY m	RECOVERY %	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES Weathering, Alteration, Fracturing, Veining, Mineralisation	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES
20.6	22.7	20.6	22	0.3		HQ	T1	Broken qtz. Massive with possible cleavage barren.						
22.7	23.0	22	23.2	1.2		↓		Mst with increasing proportion of laminations						
		23.2	23.6	0.4				towards end of interval (subsequent increase in						
		23.6	25.1	1.4				sand.) Appears largely altered / weathered						
		25.1						& the fine sulphide (py) veinlets (<1mm). Also						
								fine fractures (↑S1 to S0) with ≤ 4 mm wide						
								alteration halos						
23.0	25.2							Predom. sandstone (sst) with minor mud laminations						
								(Good So) Increasing prop of qtz (vuggy)						
								veins (≤ 4mm) ± minor py grains. Also						
								have fractures as above with alteration						
								halos. These alteration zones typically bleached						
								with a probable sericite (chlorite?)						
								composition (→FLUIDS Potassic?)						
								Specific orientations of veins						
								(with So dipping west)						
								(1) 23.61 — vuggy qtz vein 78^SW → 315° m						
								(2) 23.75 — Fine qtz veinlet (<1mm) 88^NE → 320						
25.2	25.9							Broken (angular) sections along obvious						
25.9	27.						2	joint / fracture planes						
25.9	27.2	25.1	26.1	1				Fine grained psammitic unit with minor interbeds						
		26.1	26.6	1				of mudstone. Some beds 3 cm thick. Core becomes						
		26.6	28.1	1.3				increasingly bleached towards end of interval						
		28.1	29.1	1				Again have fractures with relatively intense						
		29.1						bleached (altered) halos. Two fracture sets at						
								varying angles						
								26.2 m fine <1mm sulphide veinlet						
								~ 85^N → 120° m						

DRILL RECORD

HOLE NO: MX1

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	Recovery m	Recovery %	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by)
~~27.2~~	29.0					HQ ↓		26.2 m. Fractured surface with Kaolin (alt.) coating 77^w → 72.0°						
27.2	29.0							(almost (metamorphic) igneous texture) Coarser grained psammite: (~1mm) grains of qtz with a white 'clayey' type grain component; possibly kaolin ~ (CO3?) This section of core is bleached although not intense is uniform throughout. There some A 3-5mm wiggly qtz veins, planar and barren 26.8 These X cut a B fine less distinct vein of qtz, chlorite? with minor sulphide (PY) disseminations This vein has dark (chl?) walls with internal qtz. Can't getting orientation BUT is low angle b/n them although min vein appears steeper. ⇒ A later generation of barren qtz Same generation qtz veins at 27.9m These veins are X cut by a C set of fine amorphous clay filled fractures - yellow-brown All some times is dark (chlorite?) Larger of these fractures displaces qtz vein approx 1cm * Displacement indicates reverse faulting Both qtz veins + amorphous fractures are sub // but dip near perpendicular. * In close proximity to qtz veins, BUT in wall rock is minor PY crystl. 28.8 Fracture at ~ 30° LCA) has coarse (1mm) euhed. PY grains (up to 1mm) this intersected by another fracture (with kaolin type coating) nearly perp (strike) where intersect, 1st fracture appears more strongly mineralised						

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DRILL RECORD

HOLE NO: MA1

LOGGED BY: A/KM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	Recovery m	Recovery %	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	ASSAY VALUES (Analysed by)
29.0	-29.9					HQ		Clay unit, has higher prop of sand towards						
						↓		top. Between 29.8 + 29.9, clay unit is strongly						
								fractured - brecciated into pieces ≤ 4cm and/or						
							3	unconsolidated material. Evidence for faulting:						
29.9	30.85	29.1	29.8	0.7				Hard siliceous unit, coarse grained on beton (p2)						
		29.8	31.1	1.0				with numerous fine fractures (irregular) with						
		31.1	32.6	1.4				fine yellow fill.						
30.85	32.2	32.6						Massive clay unit, pale yellow - grey, lacks						
								sedimentary / structures. Possible intrusive. Has						
								minor evidence for cleavage development. Often						
								get small black flecks in this unit						
								B/n ~~29.4~~ - 30.8 - 31.0						
								31.55 - 31.9						
								this yellow unit is broken / brecciated to						
								varying degrees - As above interval 2.1m, unconsolidated.						
								- Probable faulting - shearing.						
32.2	35.6							- Psammitic unit is / bleached for 15 cm						
								in contact with above interval, becomes						
								more fresh down hole.						
								B/n 32.6 - 33.2 Again psammite is						
								coarser grained with apparent euhedral (1.5 mm)						
								white grains ~ igneous texture.						
								Some veining fracturing evident. In the						
								fresher zones, (obvious) alteration halo's						
								are associated with these structures - e.g.						
								32.8 1.5 mm qtz vein (barren) is						
								displaced 0.8 mm by fracture + yellow fill striking at						
						*		low angle. Sense of displacement is REVERSE.						
								As before (27.9 m) probably represents						
								same stage qtz veining + following displacement						
								by fractures with yellow brown, amorphous fill						
								cont →						

DRILL RECORD

HOLE NO: MA1

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Vaining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	ASSAY VALUES (Analysed by)
35.6		32.6	34.1	1.6		HQ	4	→ Qtz veins appear largely extensional as						
		34.1	35.6	1.5		↓		evidenced at 34.51 where see Qtz fibres						
		35.6	36.7	0.7				(vuggy) perpendicular to vein wall.						
								Qtz vein plane at 34.4 (1cm wide)						
								with minor dissemination of PY (?SP?)						
35.6	36.2							Again siliceous, very hard -30° LCA						
								unit with sparse						
								qtz grains - clear irregular shaped ≤1.5mm						
								Minor prop of white, opaque grains						
								in fine grained green brown groundmass						
								- igneous texture! During length of this						
								interval, this unit is moderately brecciated.						
36.7	37.1							Grey psammitic unit with fractures & alteration						
~~36.7~~		~~36.2~~				~~HQ~~		halo's. At ~~high~~ low angles to LCA						
37.1	39.35	37.1	39.0	2.7		NQ		As above grey psammitic unit (with mica						
		39.0	41.75	2.6				component) & bleached halo's associated with						
		41.75	41.95	0.2				fracturing & fine veinlets of amorphous material						
								Minor v. very fine dis aggregate of sulphide ≤0.5 mm						
								along some fr veinlets						
								b/n 37.5 - 37.7 core is brecciated. NOT						
								intense though. Some faces have minor clustering						
								of PY-(?)ite (?) with late fluid. The						
								rock is the coarser siliceous unit with a						
								bleached (altered?) appearance						
								38.7 (rather fine) unit has 1 cm wide						
								barren qtz vein (~80° LCA) is seen cut by						
								a fine irregular fracture which appears						
								mostly PY filled (dusted surface) This becomes						
								less obvious when passes through other side of						
								qtz vein Sulphide veinlet is largely (15°) to LCA						

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DRILL RECORD

HOLE NO: 1141

LOGGED BY:

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES Weathering, Alteration, Fracturing, Veining, Mineralisation	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by)
39.35	41.75							Lithology becomes more pelitic, with psammite are faint laminations of mud ~ micaceous material. These are bleached ~ yellow but have no apparent association with fractures - veins etc. These interbeds become more prominent away from the psammite and therefore create a graded bed. effect. Fractures + fine sulphide veinlets (irregular) have produced a more intense alteration bleaching through these layers. [Probable So alignment (?) dip.] Veinlets of S material 39.5 <0.5mm clay + S ... 58N → 312° m 39.? fine fracture <0.5mm ... + alt halo (3mm) possible S material within 75SE → 052° m B/n 40.4 - 40.5 core is fragmented. ~41.4 Qz veinlet (~1mm) + plag with fine disseminated sulphide 55E → 348° m (all to So) * So (assuming (?) dip) : 72°W → 350						
41.75	41.85							More siliceous zone, still has considerable clay component						
41.85	43.7							More pelitic interval b/n 42.5 - 42.7 where pelitic ~~is~~ has carbonaceous component - graphitic. On some fractured surfaces in this interval, fine grained green-brown alteration (white mica) present. 1-2mm qz veinlets also orientated - 80° LCA. Are some black clayey (carbonaceous?) fracture surfaces at ~ 42.9. In solid core adjacent to this surface are subparallel black filled fine fractures - irregular. ∴ Possibly						

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DRILL RECORD

HOLE NO: M.A 1

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	ASSAY VALUES (Analysed by)
		41.45	44.65					veinlets of carbonaceous material ~45° CCA.						
45.7	45.9	44.65	45.10					Increase in silica. Rock becomes harder and is actually						
		45.1	48.15					Brecciated b/n 43.7 - 43.8						
45.9	45.0							Pelitic unit with minor interbeds (not distinct) of						
								quartz rich layers						
								44.4.5 2 Qtz veins 11 and 3mm wide with no						
								obvious mineralisation but a few fractures < 1mm						
								with CO$_3$ qtz possible sulphide (also parallel)						
								To 3 veins high angles to CCA ~75°						
								Within the pelitic zone are minor, fine disseminations						
								of PY. Fine, irregular horsetail fractures then						
								host some PY min.						
								b/n 44.55 - 44.6 is brecciated zone within						
								fragments was an obvious qtz vein with minor						
								PY and Sb (probably - dark-black v reflective)						
								mineralisation; coarse, euhedral aggregates ≤ 2mm.						
								qtz vein 3-6mm with						
								strikes → 320°						
								b/n 44.65 - 45.0 a pelite shows 5-8 mm						
								laminations with a thicker 6cm layer						
								also - Good So.						
								Assuming West dipping So						
								85 → 355						
								Also in this section fine fracture with possible						
								sulphide 78E → 040°						
45.0	48.3							Psammite b/n 45.1 → 45.35 is bleached (light grey)						
								with 3 parallel, 5mm wide qtz veins, vuggy with						
								minor PY de...						
								7 → strike → 355						
								" " → 035						
								Interval becomes less bleached (→ grey black) but						
								have bleached (yellow) alteration halos about						

DRILL RECORD

HOLE NO: MA1

LOGGED BY: M.K.M

Depth From (m)	Depth To (m)	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)
		veinlets 6/mm) Two veins ~60° LCA with a
		prominent joint(?) surface also at this
		interval 30° LCA
		At 45.79 is a 6mm qtz vein
		surrounding host rock a partly laminated pelite
		is grains of PY + possibly arsenopyrite
		Get So 84° → 355
		vein 14° → 010°
		45.75 - .80 core is slightly brecciated
		46.1 - 46.45 zone of milky qtz veins, high
		(relatively) density. This type of qtz is typical of
		mineralized qtz. One vein at 46.1 is 4mm
		wide, wavy with qtz grains normal to the
		vein wall and contains a 9mm aggregate
		of PY. This vein 70° LCA and x cuts
		narrower veinlets at low angle to LCA
		is a fine PY/qtz veinlet (≤1mm) some
		orientation as principle vein
		Appears as a zone of dilation
		due to the apparent random orientation of
		veins. Mostly barren, is minor PY in
		wall rock
		~ 47m → 48.3 brecciated core. Dominantly
		qtz rubble, are larger prominent angular fragments
		The qtz is barren and appears metamorphic qtz
		Host rock is bleached probably sericite alteration
48.3	49.0	Massive structureless interval of predom. siliceous
		mudstone unit - grey with greenish tinge
49.0	49.2	is fractured
↓	↓	The above unit is brecciated + unconsolidated
		qtz vein fragments present + kaolin clay
49.2	49.5	The massive unit becomes coarser grained

DRILL RECORD

HOLE NO: MA1

LOGGED BY: MKM

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	RECOVERY m	RECOVERY %	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by)
								adopting an igneous type texture is						
								still fractured and contains random						
								milky qtz veins. Sulphides py/asp present						
								in this interval						
49.5	51.75	48.15	51.2					Hard siliceous unit, light green/grey is generally						
		51.2	54.25					massive although shows minor pelitic laminations						
								~~Again shows a [illegible] texture~~						
								This unit is consistent with previous coarse						
								textured siliceous lithologies - although finer						
								grained						
								The interval is brecciated b/n 49.6 → 50.1						
								50.6 → 50.8						
								Is fragmented qtz veins in these brecc. zones						
								Towards the end of this interval the core						
								becomes less bleached more grey black, BUT isn't						
								a straight contact change - contact b/n alt. zone						
								+ fresh lithology wavers						
51.75	51.85							Coarse grained siliceous unit, graded So. from						
								underlying layer ie increase in grain size						
								Vuggy 5mm wide qtz vein at 51.95						
								[illegible] 65° LCA						
51.85	53.8							Fine grained psammite (siliceous unit?) has						
								two yellow-white (light) blocks - mica component.						
								This interval almost bleached and shows (minor)						
								some pelitic layers						
								[illegible] So 78ᵂ → 355						
								Are thin vuggy veinlets (qtz) ≤ 2mm wide						
								developed at a high angle to the LCA						
								At 53.6 is a 2.3mm wide qtz						
								vein - has cavities within which euhedral qtz						
								grains have grown from the vein wall - Normal						
								to the wall. This vein has formed in an						

DRILL RECORD

HOLE NO: MA1

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by)
								extensional environment which remained as such (ie open) for considerable time therefore allowing euhedral crystal growth perp. to the fracture surface. This qtz vein has Py dep and also Sb min (black [illegible]) – ~45° LCA						
←	→	53.9	53.9					Coarser grained siliceous unit again (almost appears as (fine) grained conglomerate where groundmass been altered to sericite. Again glassy qtz grains + some white opaque grains						
←		55.9	55.9					Fine grained psammitic unit again. Mostly bleached (pale) with ore mud lamination at 54.9 m So 85° → 350 Fine Py filled fracture at this depth 50°? → 010°						
				54.25	57.30	3.05								
		55.9	56.3	57.30	60.35	3.00		~Pelitic interval. Note So btw psammite/pelite contact 70° → 350° Qtz vein 55.8 → 38° NW → 240 " " 56.3 25° E → 360						
←		56.3	59.1					Fine grained psammitic unit is bleached towards upper contact with pelite – notable pelitic laminations. This grade into fresh grey black (white flecks) psammite unit to end of interval. Are fractures at intermediate angles to the LCA and have distinct 1–4 mm alteration halo's (distinct against fresh lithology						
└		59.1	60.35					* Uniaxial (chert) Partly dark fine grained psammite (cont →)						

DRILL RECORD

HOLE NO: MM1

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by)
						NQ		The unit appears a poorly sorted conglomerate with clasts measuring up to approx 10 cm, are angular to rounded and are of mud/silt composition. The framework is open being supported by a matrix of coarse psammite (as below) - Qtz crystals ~ ≤ 2.5 mm, this unit also appears supported by a groundmass of white mica. At 60.35 → 60.55 the unit is partly brecciated. This unit has minor fracturing; irregular and at varying angles to the LCA						
60.55	61.1	33.35	33.4					The [illegible] PSAMMITE, fresh, cut and [illegible]. 2 Qtz veins both [illegible] small (< 0.5 mm) Py/grains. 60.5 // 88° E → 335; 61.0 // 60° → 353 / Planar 2 cm thick. For So - sand contact with pelite (below) [illegible] mineral						
		[illegible]	[illegible]											
61.1	62.1							Dominantly PSAMMITE but contains laminations of SILTY PSAMMITE. So at 61.1 82° (0.18) → 350°. ~61.2 2 mm Qtz vein // to So (1x2 grains Py). ~61.5 laminations show possible X-bedding. Truncations indicate younging to the 30° → on [illegible] limb of anticline. The fracture [illegible] irregular with minor Py dep. 53° → 276°						
62.1	[illegible]							The [illegible] PSAMMITE is dark grey-black. The [illegible] interval are fractured veins and distinct alteration [illegible] halos.						

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DRILL RECORD

HOLE NO: [illegible] 1

LOGGED BY: [illegible]

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by)
								63.2 – 63.4						
								B/n [illegible] are [illegible] qtz vein relations						
								One vein which forms a high angle (~55°)						
								to LCA [illegible] into two veins which						
								are low angle ~5° to LCA. Both 'granular'						
								are then X cut by 2cm wide planar						
								qtz vein. Both generations of qtz veining						
								[illegible] minor [illegible] PY deposition.						
								[See diag ~3 [illegible]]						
								63.9 2cm qtz vein [illegible] to LCA						
								is barren & doesn't have alteration envelope						
								[illegible] 63.? → 65.? is [illegible]						
								[illegible] & thin (2mm) veinlets of [illegible]						
								material which are 50° LCA. Dimension						
								of alteration halo is proportional to						
								width of [illegible] ie [illegible]						
			69.5					halo within 66.8 – 67.1. Fracture at ~15° LCA						
[illegible]	67.2	[illegible]	[illegible]	3.05				PELITIC [illegible], fine laminations						
[illegible]	68.1	69.5	72.[illegible]	[illegible]				Fine grained PSAMMITE, fresh						
								Vein, 3mm wide at 67.9. Contains						
								qtz & minor PY. ~35° LCA						
68.1	68.3							Yellow (bleached?) hard siliceous unit. Similar texture						
								to psammitic unit however no obvious fracture						
								in vicinity to account for possible later fluid						
								flow → alteration. Also is massive, maybe						
								some form of intrusive? Has irregular chert [illegible]						
[illegible]	69.5							Fine grained [illegible] PSAMMITE						
69.5	70.8							Pelitic laminations not distinct probably indicating						
								X bedding. B/n 70.0 → 70.45 is zone of						
								(altered) [illegible] clay which is soft and						
								unconsolidated. Also fractured ~ possible shearing.						

DRILL RECORD

HOLE NO: WA 1

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by) ANALABS: Au	Sb (PPM)
70.9	72.3							PSAMMITE (all psammite has a mica component) Top ~1.5 m of this psammitic interval is bleached (to yellow/green) and changes into fresh rock parallel to laminations. Couple of parallel 2-5mm planar qtz vein [illegible] ~45° LCA. Other fractures with distinct alteration halo's							
72.3	72.5							Increase in PELITE, still psammitic component. This interval shows bedding and* disseminated PY and Sb dissp in rock. These single grains (+ aggregates) (up to 2mm) appear to be [illegible] parallel to So. On couple of broken core faces (fractures) the sulphide grains are coarse & euhedral. Gives rock a 'spotty' appearance							
72.5	77.8	72.55	75.5					Large interval of fresh fine grained PSAMMITE with minor mud laminations. Few bleached bands 1-3mm with (bedding fractures ~50° LCA) Minor veinlets. Some fine dissemination of PY in some portions of psammitic interval.							
		75.6	78.65					Qtz veining b/n ~77.0 → 77.3	87001	77.15	77.26			0.11	–
								[illegible] → 3cm white veins are [illegible] ~3 principle orientations, 2 at high angles to each other, low angles to LCA. Sulphide (PY) & Sb mineralisation qtz is vuggy with euhedral growth into cavities. Some [illegible] bleaching about veins. Alteration appears related to veins. Mineralisation is probably most intense so far. Still sporadic [illegible] in veins but greatest proportion.							
77.8	77.9							Yellow Grey Siliceous (pelitic) unit with dissemination of PY (Sb) Spotted unit							

DRILL RECORD

HOLE NO: MA 1

LOGGED BY: MKM

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	RECOVERY m	RECOVERY %	Core Size	Graphic Log	CORE DESCRIPTION	SPECIAL FEATURES Weathering, Alteration, Fracturing, Veining, Mineralisation	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by)

DRILL RECORD

HOLE NO: MA 1

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	ASSAY VALUES (Analysed by)
								is a set of 3 parallel qtz veins						
								2mm wide with 1cm (total) alteration						
								halo. Vein is vuggy with [illegible] euhedral						
								crystal growth into cavities. Up to 2mm						
								[illegible] of PY in veins - uncommon						
								The set is 30° LCA.						
								At high angle ~70° is a [illegible]						
								vein with coarse qtz and PY deposition						
								Core is broken along this plane						
								[illegible] jointing [illegible] this						
								interval ~ 145° LCA						
		90.85	93.4					At [illegible] is qtz veinlet (2mm) wide						
		93.4	96.4					almost perpendicular to LCA						
93.0	93.5							PELITIC PSAMMITE [illegible]						
								throughout this interval						
[illegible]	100.3							[illegible]						
								[illegible] alteration [illegible] 94.0 - 94.1						
								[illegible] significantly						
								[illegible] qtz [illegible]						
								[illegible] fractures with [illegible]						
								alteration [illegible]						
		96.4	100.0											
100.3	100.7	100.0						PELITIC PSAMMITE [illegible] siliceous [illegible]						
								[illegible] indicating [illegible]						
								So 78 [illegible] 335						
								(12F)						
100.7	101.8							PSAMMITE (fine, [illegible] grained)						
								2mm qtz [illegible] (no dip [illegible])						
								76 [illegible] 328						
101.3	101.4							Yellow (bleached?) siliceous unit						
101.4	101.7							PSAMMITE with a coarser layer 4cm						
								of qtz / [illegible] qtz grains 2mm + [illegible]						

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DRILL RECORD

HOLE NO: MN 1

LOGGED BY: MNM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION	SPECIAL FEATURES Weathering, Alteration, Fracturing, Veining, Mineralisation	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by)
101.?	101.8							Bedding of PELITIC PSAMMITE							
101.7	102.5							[illegible] PSAMMITE (fine grained)							
102.5	102.7							Bedding of PELITIC PSAMMITE							
								(POSSIBLE graded bedding indicates							
								younging to [illegible] for [illegible] west dipping							
								limb of anticline)							
								S_0 78^W → 350							
								(-12^E)							
102.?	103.?	100	103.85	?				PSAMMITE							
?	104.1	103.85	106.1	70?				PELITIC PSAMMITE More prominent mud							
		106.1	109.15	3.05				compressed laminations between 103.6 → 103.9							
								and brecciated, partly unconsolidated clayey							
								unit with disseminations of [illegible] and							
								~~[illegible]~~ silica. SPOTTED yellow clay unit							
								Some [illegible] are coarse – < 2.5 mm / The							
								[illegible] of core is fractured (jointed) at							
								high angles to the core. 80–90°!!							
104.1	105.6							END [illegible] PSAMMITE is generally fresh,							
								hard [illegible] slight [illegible] with							
								alteration holes ~~from~~ some broken surfaces							
								[illegible] alteration [illegible] probable							
								stibnite (SB) mineralisation							
								3 generations fracture in this							
								interval (not S_0 from underlying pelite)							
								2) 2°N → 300 qtz veinlet							
								Xcuts 3) 70^E → 330 fracture/jt							
								S_0 62^W → 350°							
105.6	106.5							SILICEOUS PELITE. Is still hard like							
								psammite however has various beds unlike							
								psammite unit which is generally massive							

DRILL RECORD

HOLE NO: MA1

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	Recovery m	Recovery %	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	ASSAY VALUES (Analysed by)
106.5	114.3							Psammite is generally fine grained						
								[illegible] coarser [illegible] (up to 1.5 mm						
								in [illegible] [illegible] [illegible] - Open Fractures						
								These coarse layers between						
								106.35 → 106.85						
								107.25 → 107.36						
								108.8 – 109.62						
								[illegible] fresh with alteration halos						
								[illegible] fractures [illegible] [illegible]) are						
								distinct ~45° ∠CA						
		107.15	112.2	3.05				- [illegible] coarse layers between						
		112.20						112.0 → 112.5						
								Unit [illegible] [illegible] [illegible] [illegible]						
								[illegible] at [illegible] [illegible] [illegible]						
								[illegible] (? [illegible] [illegible])						
								[illegible] exposed [illegible] [illegible] faces [illegible]						
								[illegible] [illegible] [illegible] / aggregates < 4 mm.						
								[illegible] grains are [illegible] [illegible]						
								[illegible] are [illegible] [illegible] subplanar /						
								[illegible] [illegible] at 111.3 ~ 70° ∠CA						
								[illegible] [illegible] mixed core [illegible]						
								112.5 — 117.7						
								In this section psammite is partly [illegible]						
								and some mineralised [illegible] [illegible] also						
								[illegible] [illegible] This [illegible] → [illegible]						
								[illegible] [illegible] [illegible]						
								[illegible] [illegible] ([illegible] [illegible])						
								at 114.6 [illegible] 11 to [illegible] [illegible] cleavage						
								shown in the psammite [illegible] at 114.8						
								[illegible] [illegible] [illegible] almost perpendicular						

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DRILL RECORD

HOLE NO: [illegible]

LOGGED BY: [illegible]

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	RECOVERY m	RECOVERY %	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by)
114.3	114.85							PELITIC PSAMMITE although distinct mud						
								laminations are fine (<1mm) bands of						
								black [illegible] - [illegible] graphite (						
								So 84W (/ [illegible] 350						
								[illegible] qtz vein // [illegible] at 114.55						
								So 15E → 350						
								[illegible] west dip [illegible] =						
								- qtz veinlet · 88N → 370°						
								[illegible] + alt. halo 2 NE → 330						
114.85	115.6	112.2	115.2	3.0				PSAMMITE (fine grained)						
115.6	115.9	115.2	118.3	3.05				Unconsolidated brecciated material of dom. siliceous						
		118.3						composition. Alteration has [illegible] bleaching						
								+ introduction of clay [illegible]						
								(i.e. [illegible] (Mg) rich) No [illegible] qtz						
								[illegible] in this fault zone, [illegible]						
								PY disseminations present.						
115.9	118.3							PSAMMITE (fine grained, [illegible]) Again some						
								fracturing [illegible], [illegible]						
								producing alteration halo [illegible]						
								Some [illegible] qtz [illegible] ~75° LCA						
								[illegible] alt. bands (generally [illegible]						
								[illegible] dip is 35° LCA						
								other qtz veining ~45-50° LCA						
118.3	118.7							(Pelitic) PSAMMITE [illegible] bedding, dominantly						
								[illegible]						
								So 78W → 350						
								(8E) → 350						
								18 W dip - qtz vein at						
								68NE → 327						
								Fracture (& minor alt band) 12E → 005						
								[illegible] 49 5E → 254						

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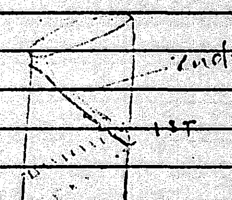
DRILL RECORD

HOLE NO: MH 1

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by)
119.1	121.5							Fine grained PSAMMITE. Minor fracturing and alteration. Between 120.3 – 120.5 is a qtz vein with veins 4 and 1.5 cm thick, vuggy with minor PY grains in some cavities & adjacent altered (bleached) wall rock. Veins approx 65° ∠(A)						
		119.3	121.5											
		121.5	126											
121.5	121.80							Bleached PSAMMITE. Interval contains set of qz veins which are (sub) parallel vuggy with obvious qtz fibres at 90° to vein wall. Minor PY deposited in cavities. Two veins 2mm thick & 5mm 75° to ∠(A). A second set of similar type qtz vein looks to offset first set. These strike ∥ to first but dip at 45° to first in opposite direction ie						
														
121.80	124.9							Fine grained fresh PSAMMITE. – Couple of 1.0 – 1.5 cm thick qtz veins. One ↗ vuggy high cavity porosity & contains coarse [illegible] grains (chloritic) and aggregates – Foliation strongly also 45° ∠(A) ∥ V – Minimal alteration associated with these mineralised veins. Adjacent minor fracture have alteration / halos → Needs 2 separate [illegible]. [illegible]						

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DRILL RECORD

HOLE NO: MA 1

LOGGED BY: , MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	Recovery m	Recovery %	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by)
								equilibrium (chemically) with wall rock; the						
								latter disequilibrium! (2 generations)						
								(2) Same fluid, evolved in time. Relatively						
								common that the thicker [illegible] veins /						
								have negligible alteration						
124.9	125.7							Bleached ✓ PSAMMITE no significant fluid						
								channel in this interval!						
125.7	126.8							Fresh fine grained PSAMMITE. Some [illegible]						
								[illegible] / 3mm vein has no [illegible]						
								[illegible] wall (very) possible (chlorite)/sericite						
								alteration						
126.8	127.1							BLEACHED PSAMMITE Yellow-green alteration						
								Coincides with ~~high~~ a fracture/[illegible] 45° CA,						
								probable source of fluid. No obvious min.						
				3.05										
127.1	127.45	124.4	127.45					PSAMMITE (fresh)						
127.45	~~127.6~~ 127.75	127.45	132.5	3.01				PELITIC PSAMMITE (Faint laminations)						
								So 85^W → 355						
								(8^E)						
								Veinlet at 127.4						
127.75	128.75							(Wobble) 87^W → 008 [illegible]						
127.6	127.8							PSAMMITE Veinlets using 128.6 → 7.7						
~~127.8~~	128.							1) 25^NE → 125 X cut by 2) [illegible] 27^SE → 058						
128.5	129.2							PELITIC PSAMMITE/Some obvious bedding						
								b/n mud + more siliceous layers						
								So 65^W → 350						
								~~[illegible]~~ ‖ (So [illegible]) 18^W → 350						
								Rotate core about 180° still DIPS						
								west						
								At 129.1 Coincides fractures ‖ to So, also						

DRILL RECORD

HOLE NO: MA 1

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by)
								a fine (1mm) solid PY veinlet // to So						
								This immediate zone approx 4cm which is						
								strongly altered with some qtz infusions.						
129.2	129.65							Fine grained PSAMMITE. generally fresh although						
								c/w / 129.35 → .47 is a bleached /						
								zone with short, ~~mixed~~ aligned lines (→ So?)						
								of PY.						
129.65	130.??							Bleached PY SPOTTED unit. Dominantly PELITIC						
								is solid core though significant fragments of						
								the pelitic material may have been introduced						
								in the mineralising fluids (Yellow - cream color)						
								. PY also seen in fine lines (< 1mm)						
								which are parallel approx 2-5 mm apart						
								These may represent original So laminations						
								which have acted as fluid pathways. Often						
								get aggregates forming along these lines						
								& V [see note book MA A p4]						
								Also mineralised qtz veins in this interval						
								use PY lines as So						
								// 86w → 350 } again [illegible]						
								about 180° ≥ (6w) → 550 } w dip						
								Qtz vein						
								using // 86sw → 308 (1cm thick						
								& shallow qtz veins with coarse qtz						
								+ PY are ∫ sub parallel to So						
								- qtz vein at 130.6 8mm thick, fine gr						
								PY aggregate 6mm ~85° to LCA						
130.9	134.45							PSAMMITE. Some veining and alteration						
								- 6mm qtz vein (main?) / x cuts 2mm vein						
								65° ∠ CA // to LCA						

DRILL RECORD

HOLE NO: MA 1

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES Weathering, Alteration, Fracturing, Veining, Mineralisation	Sample No.	From (m)	To (m)	Recovery m	Recovery %	ASSAY VALUES (Analysed by)
								Qtz veining						
								132.7m J D 1.2cm wide planar, Has an aggregate 4mm of stibnite. Also appears to contain a foliation						
								16SE → 026°						
								B/n 132.7 → 133.15 is a 'long' qtz vein which is parallel to the LCA. This vein contains black lines (graphite? stib?) which appear continuous from the host rock – defining So (?). From this LCA ‖ vein Xcuts ~~extends~~ a narrower vuggy qtz vein (1-2 mm) which is ‖ to Jcl ⊥ to "black lines" (So) [see MA note book A p 4]						
								Main vein 46NE → 330°						
								So? (Black line relationship)						
								88E → 350° } Both						
								2E → 350 } East!						
								?? hinge ??						
		130.5	133.55					Same vein (‖ LCA) relationship at 134.1						
134.45	136.0	133.55	136.6					– with CPY dep. (Au??)						
								Veining & bleaching of fine grained PSAMMITE						
								J At 136.4 is an irregular vein which is ~‖ to LCA and contains relatively significant stibnite min. From the vein are perpendicular tension fractures with associated alteration. Also in this interval are solid, irregular veinlets of PY						

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DRILL RECORD

HOLE NO: MA 1

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by)
								At 135.7 → 7.8 is a thick (metamorphic) qtz vein contains a foliation also minor stibnite min.						
136	136.4							Pelitic Psammite: Are distinct bands (2mm) of & lines (<1mm) of lighter material ~ mud. Throughout this [illegible] and last 13cm of above interval is fine irregular short lines of (black) material ~ mafic sulphide. Too fine to distinguish. These form a array. Probably indicating [illegible] tension (cracks). Also fine solid veinlets of PY irregular & minor often ∥ to S_0 (lamination)						
136.4								S_0 68W → 350 } Both ∪; 12W → 350						
	140.9							PSAMMITE generally fresh contains fractures & veins with alteration halos. 1st. Qtz veinlets 2mm wide – 7mm. Thicker are vuggy with coarse qtz, cavities & PY along ~45° LCA. 2nd fine set striking sub ∥, dipping at high angles – also ~45° LCA						
		136.6	[illegible]	3.05										
		139.65	14[illegible]	3.35				Qtz vein at 137.7 PY & Stib min 7mm thick, 80° LCA. 137.9 Solid fine (<1mm) planar PY veinlet ~ 80° LCA. Minor brecciation at 139.05						
140.9	142.95							PELITIC PSAMMITE Interval shows some distinct laminations. S_0 80°W → 350 } Both ∪; 5W → 350. Qtz vein 60E → 330						

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DRILL RECORD

HOLE NO: MA 1

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	Recovery m	Recovery %	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by)
142.9	143.1							Bleached PY (+SB?) spotted unit. Similar siliceous host material. Brecciated qtz vein(?) at 143.0 (2 cm)						
143.1	144							Banded PELITE/PSAMMITE. At 143.5 is bleached PY spotted unit + qtz vein. Some So ‖ fine PY veinlets						
144	144.8							Fine grained PSAMMITE. Some minor bleaching.						
144.1	145.8							Pelitic PSAMMITE including 8 cm of bleached PY spotted unit at 145.0 m. Fracture surface in this unit exposes clusters of PY.						
145.8	145.9	142.7	145.75	?				PSAMMITE, slightly altered (bleached)						
145.9	146.7	145.75	148.7	3.0				BRECCIA. Angular fragments (~1 cm → 5 cm) of (partly mineralised - PY [STB]) qtz and altered PSAMMITE → Evidence for post mineralisation deformation						
146.7	146.84							Altered PELITE, containing minor disseminations of PY and a veinlet ‖ to So, dipping approx. ... (partly brecciated)						
146.84	147.2							Bleached (altered) PSAMMITE						
147.2	149.2							BRECCIA. Fragmented altered PSAMMITE, composed of clay ... due to min. fluids. Some brecciated qtz.						
148.2	148.75							Bleached PSAMMITE (Yellow - green alteration), partly brecciated at 148.6 → .7						
148.7	149.1							BRECCIATED PSAMMITE (bleached) - Good dist... of PY on fractured surfaces						
149.1 ↓	149.2							Bleached PSAMMITE						
149.2	149.75							BRECCIA. Dominantly PSAMMITIC host rock with						

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DRILL RECORD

HOLE NO: MA 1

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by) Au	Sb
149.75	150.							disseminations of fine veinlets of solid PY.							
↓	↓							Altered PSAMMITE, some fracture surfaces							
								dusted with fine PY							
150	150.4							Minor brecciation of the PSAMMITE.							
150.4	150.7							PELITIC PSAMMITE Diffuse laminations (?)							
150.7	153.[illegible]							PSAMMITE slight alteration with a 2cm							
								zone of bleached, PY speckled psammite at 150.8							
~~15~~[illegible]	~~33~~							Zone of fracturing minor brecciation On surfaces							
		149.8	151.9	2.05				is chloritic coating Fractures low angle (15–45 LCA)							
"	"	151.85	154.83					Breccia small fragments, some unconsolidated material							
153.2	153.4	154.[illegible]						Fragments are partly – strongly altered							
								psammite (pelitic?), speckled PY and with							
								minor qtz veining							
153.4	157.[illegible]							PSAMMITE (fine grained)							
								At start of interval is some PELITIC							
								laminations (.6cm of core)							
								So 56 ~~60~~ → 350, About 180°							
								.77 → 350 Both [illegible] dip							
								B/n 153.9 – 153.95 Breccia of altered							
								psammite & qtz							
								At 154.25 2 planar // 3–5 mm							
								qtz veins (barren) in an almost black host rock.							
								graphitic psammite?							
								Some minor pelitic laminations							
								b/n 155.7 → .8							
157.[illegible]	158.65	154.9	157.95				3	Coarser grained PSAMMITE							
		157.95	161.0				VA	B/n 158.0 → 158.6 Core is bleached	87002	158.1	158.25			2.00	170
								altered with relatively thick mineralised (PY, SB)	87003	158.25	158.7[illegible]			5.100	15
								qtz veins (4cm) (160° LCA)							
								being at ~~158.2~~ & [illegible]							
								→ 158.2 & 158.61							
								Both planar, second one angle to // to So							

DRILL RECORD

HOLE NO: MA 1

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by)
158.5	159.7							PELITIC PSAMMITE Some lamination						
								So '70ᵂ → 350° ; 180° *						
								1ᵂ → 350° - ?						
								Brecciated qtz b/n 158.75 → .85						
								Some lamination probably have						
								graphite component						
159.7	168.5							Fine grained fresh PSAMMITE contains						
								few / fine veinlets NO alteration						
								other veinlets HAVE alteration						
								Again further evidence for TWO separate						
								(or / evolved) fluid.						
								Couple of pelitic layers ~1 cm						
								thick b/n 163 → 163.15						
								So 70ᵂ → 350 } about 180						
								18ᵂ → 350						
								(more accurate than						
								above)						
								Veinlets with X6 70° dip.						
								1 mm qtz (10:) veinlet planes						
								14ᵂ → 350						
								86ˢ → 288						
		161	164.05	3.05				Minor pelitic layers b/n 163.45 → .7						
		164.05	167.1	2.95				Also in this section is a mineralised						
								qtz vein which appears to divide						
								So 73ᵂ → 350						
								Vein 1cm thick 78ˢ → 262						
								Thin (<1mm) solid Py veinlet abutt this						
								vein						
								Py veinlets 80ᴺᴱ → 310						
								Brecciation of Psamm. core b/n 164.85 - 165.2						
								Fragments altered with some Py disseminations						

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DRILL RECORD

HOLE NO: MA 1

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by) Au	Sb
								One fracture in this brecciated zone is ‖ to 40 LCA & has a slickensided fracture. One "flat" PY aggregate on surface has the same fracture. ✓✓							
								* → Movement along fracture POST PY dep.							
								– occur qtz veinlets 166.8 – .9. Both are subparallel ~75° LCA, min. BUT one has alteration halo, other does not							
168.7	169.3							BLEACHED PSAMMITE. Some high angle fracturing to 40 LCA. A few / those minor PY min.							
		167.1	170.15	3.01				Low intensity Breccia zone b/n 168.75 — .95							
		170.15	173.2	3				Angular fragments often have PY dustings on surfaces.							
168.9	169.6							(Strongly) altered PELITE, BRECCIATED. Has qtz (mineralised here) veins with green altered host rock – sericite/chlorite. Fine qtz veins often ‖ to this foliated fabric							
	170.0														
169.6	170.0							Bleached PSAMMITE with PY spots							
170.0	171.7						A?	Strongly altered Pelite (some siliceous zones). This interval is brecciated in sections whilst solid core is very soft & clay dominant. Intense PY (5%) as grained disseminations present: Giving core a crazed texture. No obvious qtz veining. Thus mineralisation confined to host rock.	87004	170.4	170.95			10.83	290
171.7								PSAMMITE. Bleached altered to 174.25. This strong bleaching has associated PY dissemination from minor → intense. Fracture surfaces dusted with PY. Breccia zones b/n 172.7 → 173.8, within							

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DRILL RECORD

HOLE NO: MA 1

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	ASSAY VALUES (Analysed by)
								this brecciated interval cov [illegible] qtz						
								veining. Kaolin (?) - pelitic component (probably						
								introduced by min fluid) in ~~[illegible]~~ rock						
								At 177.25 is a qtz vein						
								which divides. Approx 2.5 cm thick. 45° CA						
								has ~~[illegible]~~ [illegible] alteration envelope (4.5 cm						
								wide)						
		173.8	176.25					Although reasonably fresh [illegible] core						
		176.25	179.3					(Trace 2%) [illegible] [illegible] b/n 174 → 180.2 has						
								significant fracturing & veining of genuine						
								[illegible]. Alteration [illegible] proportional						
								to size (width) of vein.						
								Generally fracturing & veining at						
								variable angles						
								- Vein at 176.35 1cm thick 5 mm alt.						
								70° CCA						
								Vein at ~177 thicker, 2-3 cm, more						
								irregular 45° CCA						
								178.2 Planar 1cm wide vein minor min. No alt.						
								Probable CO_3 also in vein						
								179.7 Thick (15 cm) vein of very coarse						
								qtz. Some euhedral crystals 1.5 cm long &						
								euhedral into cavities - 55° CA						
								180.1 Thick (net) qtz vein which contains						
								some elongate / angular [illegible] fragments						
								- Possible hydraulic brecciation ??						
								- [illegible], vein is planar						
								Mineralised qtz / CO_3 vein at 180.7 ([illegible] [illegible])						
								75° CCA						

DRILL RECORD

HOLE NO: MA1

LOGGED BY: MKM

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES Weathering, Alteration, Fracturing, Veining, Mineralisation	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by)
		179.3	182.35	3.05				-(Psammite continues) into Tray 29.						
		182.35	185.4	3.05				(181.0 →) The unit has [illegible]; low intensity alteration						

181.65 Stronger zone of bleaching → 181.8

Brecciated (or due to drilling?) qtz vein at 181.8 – no evident mineralisation.

182.85 → 183.0 zone of yellow alteration / bleaching + surrounding (yellow)-green alteration. No [illegible] qtz / CO_3 veins here – planar thick ~60° LCA.

· This forms a low strike angle with other qtz veinlets (extension) with minor PY [illegible]:

Further qtz veining (low intensity) 1cm ~45° LCA.) to 185 where

minor pelitic laminations

horiz. S0 84W → 350
10E 350

B/A 185.7 → 186.7

Qtz veining dominated by a vein ~5-10° LCA which has sporadic PY aggregates. The vein joins a 2.4 cm vein which is orientated 75° LCA. Relatively minor ~~ext~~ tension gash veins extend from these prominent veins. Bleaching is recognised adjacent to these structures, however not intense.

Other qtz veining ~~small~~ (narrow) + minor qtz veinlets at intermediate angles to LCA observed in some alteration zones, qtz, spotted PY.

DRILL RECORD

HOLE NO: MA 1

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Au	Sb
		185.4	188.45					(Tray 30) Psammite continues							
		188.45	191.5					B/n 187.3 → 187.8							
								Zone of qtz veining (+ minor min PY+SB)							
								veins generally b/n 50-75° LCA							
								Coh/10 ~~[illegible]~~ (low angle to LCA)							
								X cutting relationships show							
								2 stages veining. Both							
								(vcb) ‖, but dip at intermediate angles to							
								to LCA at opposing directions Both							
								veins mineralised ✓ (minor)							
								187.8 → ~~1880~~ 188.45 slight increase in							
								mud content as evidenced by diffuse laminations							
								Approx So 70W / → 350							
								187.8 5W 350							
								Set of fine fractures parallel with							
								PY aggregates/grains (≤1.5 mm) along length							
								→ 335							
								B/n those fractures is ~~the~~ bleached							
								PY spotted siliceous unit.							
								At 188.1 (still in the bleached spotted unit)	87005	188.05	188.1			1.43	20
								*is a solid vein of Stib (+PY) irregular, approx							
								4mm thick 45° LCA							
								190.2 Thick qtz vein (net?) appears							
								to have been fractured, then coarse (1.2 cm)							
								PY aggregate deposited (PY only in fracture planes)							
								Zone of fine black lines. 2 major							
								orientations at ~90° (tension). Probably							
								Sulphide (PY) filled (191.45 – 191.8)							
								191.8 qtz vein 5° LCA with							
								thin band of PY deposited along the wall							
	191.5							5cm pelitic PSAMMITE							
								So 1) 60W → 350 – 2) 16W → 350 – approx							

DRILL RECORD

HOLE NO: MA 1

LOGGED BY: MKM

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	RECOVERY m	RECOVERY %	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES Weathering, Alteration, Fracturing, Veining, Mineralisation	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by)
192.5	193.4							PSAMMITE						
								Vein + clay alteration at 193.25						
193.4	194.1	191.5	194.5	3.05				PELITIC PSAMMITE fresh core with						
		194.5	197.6	3.05				faint diffuse laminations						
194.1	195.11							PSAMMITE Partly Bleached from 194.55						
								–195.11 including SPOTTED PY.						
195.11	195.45							Small breccia zone at 194.75						
↓	↓							PELITIC PSAMMITE						
195.45	202.7							PSAMMITE, Lacks veins/fractures						
								generally						
								199.1 Vein 8 mm thick (qtz)						
								= 30° LCA						
		197.6	200.6	3				200.1 → .2 Slight increase in						
		200.6	203.6	3				mud as evidenced by minor laminations						
								So 78ᵂ / → 350						
								2ᴱ → 350						
								Joint surface at 199.9 with 56 min						
								50ᵂ → 290						
								Veinlet at 200.0 [illegible] 2mm planar, [illegible]						
								67ᴺ → 212						
								Vein at 200.25, irregular, 3 mm wide						
								70ᴺ → 132						
								Vein, Min or film 88ᵂ → 347 at 200.5						
								Qtz veins (+ Min) at 201.25 + 201.4						
								Both planar + //						
~~195.45~~	~~202.7~~													
202.7	202.8							PELITIC PSAMMITE, Minor mud increase producing						
								faint laminations						
202.8	202.8							Fine grained, fresh PSAMMITE						
202.6	203.2							PELITIC PSAMMITE						

202.9

DRILL RECORD

HOLE NO: MA 1

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	ASSAY VALUES (Analysed by)
203.2	204.5							PSAMMITE High angle (~80° LCA) probable joint planes containing some fine grained SB min						
204.5	204.9							Pelite Appears to contain a significant proportion of mud. Excellent So b/n top of this interval and a coarse qtz layer at base of previous interval. This sharp contact b/n mud & coarse 'sand' indicates younging upwards (on W limb of anticline). So 58° → 350; 22 W → 350						
204.9	206.1	TFA						PSAMMITE with a possible graphitic component. 205.7 1-2 cm qtz vein (minor PY) 45° LCA. 205.95 2 // Qtz veins, mineralised .5 mm thick. They strike // to vein at 205.7 but dip opposite direction ~90° difference in dip						
		203.6	206.6	3										
206.1	206.55	206.6	209.6	3				PELITIC interval still with significant silica & possibly graphite						
206.55	217.15							PSAMMITE ! has high angle veinlets ± PY mineralisation. At 210 m core is bleached generally low of intensity & diffuse although more distinct about some veins (at 210.05) - This vein is unconsolidated, probably had large white mica / ± CO_3 component. B/n 211.7 → .85 is intense bleached zone. The source of alteration fluids						

DRILL RECORD

HOLE NO: MA 1

LOGGED BY: MKM

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES Weathering, Alteration, Fracturing, Veining, Mineralisation	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by)
		2096	2126	3										
		2126	2156	3										

possibly from the fractures that traverse this section - unlikely though. More likely a fluid percolating through host rock, rather than direct channel.

At 212.4 - .45 Couple of qtz veins
1) 2mm thick, barren & planar 2) 7mm thick with sporadic py clots. Sub // to 1) both approx 50° LCA.

B/n 212.6 - 212.8 Mineralised qtz veins show X cutting relationship
1) 1 set (2 veins), planar 2-3mm wide qtz + CO_3 - a high propⁿ of a white, opaque phase) + sporadic PY aggregates (≤ 4 mm) + probable stibnite ~35° LCA
2) Second mineralised vein (Just PY) cross cuts above set (lower propⁿ of PY than in 1) - Also this vein has less of the opaque mineral (CO_3?) Also approx 4 mm wide this (2nd) vein strikes parallel to above set but dips at a high opposing angle to 1) approx 80 - 90°.
⇒ Forms a high angle with LCA ~ 60° LCA
⇒ Appears 2nd generation of PY
Distinct, intense (irregular) alteration halos about each vein generation
⇒ 214.0 m

From 212.9 core becomes bleached generally ↓ low intensity & diffuse.
B/n 212.9 + 215.6. Psammite rock fresher but has veinlets & fractures (of varying orientations) with sharp alteration halos
* At 215.95 are two veins

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DRILL RECORD

HOLE NO: MA1

LOGGED BY: MKM

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES Weathering, Alteration, Fracturing, Veining, Mineralisation	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES Au	Sb
								One is a planar 1.5cm qtz vein with some Stibnite mineralisation - few fine grains along wall. Vein is approx 40° CCA							
								This vein appears to XCUT ~~[illegible]~~ a veinlet consisting almost entirely of stibnite (the richest STIB structure seen so far) (4+ g/t) 45° CCA							
								Both ~~[illegible]~~ orientated roughly perp. Evidence for early emp. of significant SB. (Possible spec. of broad [illegible] xco SB vein)							
								216.1 2 generation min (PY + SB) qtz veinlets: First generation 1) 1-2mm wide 75° CCA 2) " 45° CCA slight displacement of 1) indicates reverse sense of movement.							
	216.35							Blw 216.35 → .50. Significant bleaching of BAM. which is associated with a 15 cm zone of thick, irregular qtz veining. One surface shows POST Qtz deformation - unconsolidated minor SB min in close proximity to Qtz vein wall (ie again, early emp)	87006	216.35	216.5			0.025	-
217.15	217.6	217.6						PELITE is partially bleached.							
								Is a 2cm qtz (Cag) SB vein at 217.35. Planar SB is again close to wall.	87007	217.3	217.4			0.017	-
								Some PY + SB in wallrock							
								Thin PY veinlets (< 1mm) ~ // to So	87008	217.45	217.72			~~[illegible]~~ 0.225	7
								SB vein 70 NE → 310°							
								So pelitic lamination at 217.8 85 W → 350							
								Other 10 W → 350							

DRILL RECORD

HOLE NO: MA 1

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	Recovery m	Recovery %	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by)
216	246.8							PORPHYRITIC (with minor glotic (graphitic?) component) & generally fresh with some veinlets & fractures (with distinct alteration halos						
		215.6	218.6					220.4 → 55 zone of yellow/green alteration						
		218.6	224.6					- No obvious fluid channel						
								221.4 Comp 6 of 11 qtz (CY) veins						
								221.4 → 55 Fracture ~10° CCA, no associated alteration but has a green smooth surface - possibly chlorite alteration						
								221.55 → 222.65 Bleached zone generally of uniform intensity - pale yellow - cream. Small breccia & low cataclasis 6/a 222.1 → 222.4 (possible channel for alt. fluids) Surfaces of psammitic fragments are kaolin type coating. No/ mineralisation noticed. Fresh core to 224.35						
		224.6	224.6	3				Bleaching 6/a 226.7 → 228.5. Some brecciation						
		224.6	227.6	3				6/a 227.9 - 228.1 qtz veining in this section.						
								* is RELICT material in the psammitic unit 6/a 227.5 → 225.5 (in bleached zone). Within alteration zone also get Fine PY (5%?) disseminations - SPOTTED unit. Generally best developed in the siliceous lithology.						
								At 224.3 Comp 8 of qtz veins (vuggy) with yellow/green alteration - not obvious halo - 55° CCA						

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DRILL RECORD

HOLE NO: MA1

LOGGED BY: MKM

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES Weathering, Alteration, Fracturing, Veining, Mineralisation	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by)
		227.6	230.6	2.95				Throughout interval (from 37) 1/2 230.6 → 236.6 psammitic core is often dark grey – black. Although core is very siliceous – may be some graphite in the psammite. This interval (above, T37) lacks significant veining & fracturing & minimal (→ no) alteration.						
		230.6	233.6	3										
		233.6	236.6	3										
								236.58 Qtz / PY vein (4 mm thick) appears (sub) parallel to a cleavage developed in the host psammite and forms ~60° LCA angle						
								234.95 Vein qtz but dominant phase is a white opaque mineral ~ 10$_3$? Also aggregates of PY (~4 mm) also a soft black material?						
		236.6	239.6				P?	Again 'black' psammite continues. N.B. may be a pelitic unit owing to black slatey 'colour'. However, core is still siliceous. Drill bit shudder would overprint one fine – small scale rectangular structure in this interval. Usually where the unit is 'black' drill bit shudder is most pronounced. → black from drilling procedure?						
		239.6	242.6											
							PY	239.75 5 cm thick planar qtz vein. Qtz appears metamorphic although contains minor SR mineralisation. Alteration halo extends up to 5 cm away from vein. Halo 'bleached' with disseminated PY.						
							A+P sa	240.45 3 cm wide planar qtz vein with a remnant of thick (2 mm) sulphide SR along one wall. Minor PY disp. vein ~40° LCA. Alteration intensity varies adjacent to vein i.e. an increased proportion of veinlets (qtz 1-2 mm wide). Such distinct alteration						

DRILL RECORD

HOLE NO: MA1

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by)
								halos ~~[illegible]~~ developed in fresh host rock						
								Generally angles → LCA of veinlets vary						
								b/w ~30 – 65°. Occasional low angle (<15°)						
								where cross get an increased zone of alteration.						
								No obvious x cutting relations						
								241.30 → 242.95. PSAMMITE becomes						
								relatively coarse grained. Remains fresh with						
								distinct alteration bands. There zone of						
								bleaching b/w 242.7 → .9 which is associated						
								with relatively concentrated qtz veining. is						
								milky qtz (good min indicator). In core						
								vein is grain of a green/brassy						
								sulphide - Cu rich cpy? does at least						
								two generations of veining in this zone						
								- BOTH mineralised						
		242.6	245.6					~Coarse psammite unit continues into tray 35						
		245.6	248.6					Some low angle veining 5-15° <CA with						
								alteration halo & less prominent intermediate						
								veinlets (qtz) low angle appear to x cut						
								intermediate veinlets. The low angle veins						
								~~[illegible]~~ produced significant						
								alteration throughout core b/n						
								244.3 → 245.7 The veins contain						
								white opaques & are poorly mineralised						
246.8	247.5							PELITE ? Appears obvious So change from						
								coarse psammite into a fine black						
								mud layer - hard - compact. Get variation						
								of mud + silica throughout interval but are						
								sed structures again overprinted by bd shedding?						
								approx ✓ S0						
								LOG 34?/44 N 230? 68W → 350						
								25W → 350						

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DRILL RECORD

HOLE NO: MA 1

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	ASSAY VALUES (Analysed by)
								247.2 → .35 Set of mineralised (PY + SB?)						
								vein(lets) planar 2mm → 5mm wide, qtz						
								is dominant gangue. These orientated 35° CA						
								and are ✓ X cut by another vein set						
								qtz/PY 5mm wide planar. Both sets						
								strike parallel but dip at opposing						
								angles (40° → high angle [sketch])						
247.5								(Coarse grained) PSAMMITE with some						
								veining + alteration halos. Although qtz						
								in veins is "milky" appear barren.						
		250.6	251.6					250.05 - Coarse ✓ thin 2mm qtz mineralised						
		251.6	254.6					veins planar subparallel at ~~[illegible]~~ 45° ∠ CA						
								Minor alteration						
								253.7 Qtz vein 3mm planar with PY/SB						
								min. Bleached zones associated with both.						
								Within alt. got PY grains (1-2mm) also						
								~~[illegible]~~ fine PY throughout fresh psammite host						
								rock here.						
								253.5 - Is a band of concentrated PY grains						
								in host rock - unaltered.						
		254.6	257.6					Throughout tray 41 is PSAMMITE with						
		257.6	260.6					minor intervals of more pelitic lithology						
								Greater density qtz veining ‖						
								6mm → 1.5 cm thick b/n						
								at 256.3 .4 .7 .65 .85 all ~~[illegible]~~ qtz						
								with minor PY SB min. Strong bleaching						
								with veining. Veining all ✓ sub-parallel						
								with occasional short irregular veinlets of						
								~~did~~ solid PY - in association (spatial) with						
								the larger vein(s) (ie the alteration halo. Dissem.						
								PY still present in alteration zone						

DRILL RECORD

HOLE NO: MA 1

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES Weathering, Alteration, Fracturing, Veining, Mineralisation	Sample No.	From (m)	To (m)	Recovery m	Recovery %	ASSAY VALUES (Analysed by)
								This set of veins are subparallel						
								at ~ 40° ccx. Minor veining (1 mm in)						
								fracturing with minor alteration. Also.						
								→ 261.6						
		260.6	263.6	3				263.4 → ·7						
		263.6	266.6	3				Core is bleached (yellow/grey) with						
								fine (< 0.5 mm) grains of PY/SB. SILICIFIED unit						
								Brecciated qtz vein at 256.65 (barren)						
								Immediately below is 1.5 cm zone of						
								irregular clear/milky mineralised qtz veins +						
								white/cream greasy mineral (CO_3?)						
								- Few qtz veinlets (low prop?)						
								→ 266.5						
								Possible lamination at this depth. OR						
								fine fractures with alt. bands → one set of ~						
								// (bleached bands)						
								78^E → 350) EAST						
								23^E → 350) ??						
								~ fractures						
								At 265.6 qtz vein with ~ graphite (black sooty						
								material) included within it and adjacent						
								wall rock						
								266.2 → ·35 Bleached zone with brecciated						
								qtz vein. OR possibly drilling caused of						
								cavity filled vein / to fracture (repeated forms)						
								Adjacent core, PY solid veinlets, irregular						
								with minor milky qtz veins						
								Qtz vein, planar 1.2 cm with stibnite						
								min. nearer vein wall (1-2 mm acicular grains)						
268.4	265.9	266.6	269.6					Possible intrusive. Has a porphyritic texture						
		269.6	272.6					with green/yellow grains ~~upto~~ b/n 3 mm – 6 mm						
								Their anhedral in morphology. Groundmass is						

DRILL RECORD

HOLE NO: MA 1

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by)
								fine grained & grey. The unit has an appearance of ~~a~~ a conglomerate, open framework although there are no sed. structures and the unit appears to have produced an ~~alteration~~ aureole on underlying psammite 1-2 m. The unit has been intruded by some qtz veins at ~70° LCA / 45° LCA. Both appear barren						
268.9	271.4							PSAMMITIC UNIT but has green, irregularly developed bands / lines of micaceous material. Either alteration halo's about the fractures (some fractures recognised) OR some bedding feature ? So 78^E → 350 ; 5^W → 350 (~ Probably fractures + alteration)						
271.4	271.7						A	Qtz interval (vein?) is massive with very minor (<0.5% Stibnite).						
271.7	274.7							PSAMMITE with green alteration lines + bands these become more intense 272.9 - bleaching still controlled by an orientation ~40° LCA; parts of this bleaching have significant clay content ~ (So planes ?).						
		272.6	275.6					From 273.73 alteration less distinct in bands						
		275.6	278.6					and more diffuse						
274.7	274.9							PELITIC PSAMMITE. Interval is shows chloritic alteration & a qtz vein of minor [illegible] PY also present in concentrated bands in the host rock						
274.9	279.1							PSAMMITE again shows green (chloritic?) fine white mica bands & other more diffuse						

DRILL RECORD

HOLE NO: MA 1

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Au	Sb
								bleached alteration.							
								Qtz veining prominent in this interval	87009	274.5	274.22			0.012	6
								Shows some PY/SB mineralisation. These							
								generally 45 – 70° LCA, are planar with							
								alteration halos. Some veinlets more							
								irregular at varying orientations							
								B/n 278.2 → .35 is intense yellow/green							
								bleaching NOT apparently related to a							
								particular structure. SPOTTED also. Cont							
								disseminations of PY							
								278.6 Fine fractures (//) with PY deposition							
								are X cut a qtz (CO3?) vein (barren) which							
								strikes // but dips opposing direction							
								further qtz veining (+ min) at 278.9							
279.1	281.0							PELITE							
								From 279.1 → .3, appear to be							
								interbeds of siliceous/pelitic (PY) lithologies							
								(EV 50)							
								→							
								→							
								279.3 →							
								Dark pelite (graphite) with dense							
								PY disseminations throughout in irregular							
								layers. Qtz veining X cuts these							
		286	281.6					features.							
		281.6	284.6					B/n 280.3 → .5 Get bands of							
								pelitic material + PY layers (fine grained)	87010	281.0	281.5			0.142	–
281.0	281.7							FAULT ZONE Core is brecciated + partly							
								unconsolidated. Fragments are siliceous with							
								kaolin coatings. Piece of solid core							
								just before brecciated zone is very +							
								"clayey" + has high intensity of fractures + qtz							

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DRILL RECORD

HOLE NO: MA 1

LOGGED BY: MKM

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES Weathering, Alteration, Fracturing, Veining, Mineralisation	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by)
								veinlets, Qtz vein (barren) segments are located in ±6 brecciated core indicating faulting POST veining.						
281.7								PSAMMITE ±6 host 35 cm are altered / bleached with some qtz veining both planar + irregular ± mineralisation. Core becomes fresh although alteration about vein (+ fractures) still evident						
								284.7 2 sets of veins i) 75 LCA planar 1-1.2cm wide + minor SB mineralisation. These (2) X cut a qtz vein (5-10° LCA [↓ angle]) The latter appears barren						
								From 284.7 core generally becomes more bleached, diffuse - possible politic laminations						
								286.6 → .95 Core is strongly altered about qtz veins i) Thick (3cm) white barren vein (75° 28.64) and other narrow (<3mm) milky qtz veinlets at varying angles 2) One at ~5-10° LCA is X cut by (1) 3) Another at 75-80° LCA shows some PY mtd. also X cutting 2)						
		286.6	287.6					Psammite b/a 287.2 → 287.6 shows fine grained PY concentrations in bands. Also a possible politic layer for a good Sn →						
		287.6	290.6					→ PY bands // to this layer. NO alteration in this vicinity						
								287.0 qtz vein at 5° LCA thru bleached host rock. Have now EX 50 → 350 → 350						

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DRILL RECORD

HOLE NO: MA1

LOGGED BY: MKM

This low angle (~LCA) vein continues in the core to 288.44, and it shows considerable irregular bleaching about it and has crystallised white opaque ~CO_3? and is barren. At 287.9 a couple of thin (<1mm) qtz (mineralized) veinlets. Mineralised one X cuts larger low angle vein. Other barren veinlets X cut (?) by the vein

⇒ 3 generations of veining

① High angle (~75–80° LCA) veining (narrow) barren
② low angle vein (? pop^n CO_3?)
③ High angle (75–80°) mineralised

Another low angle vein (similar to previous) begins at 288.55 → .95

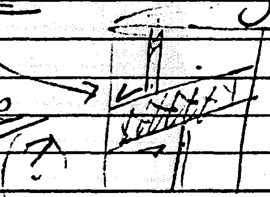
289.25 Vein (core fractured ∥ to it) 2mm wide of qtz (±sericite?) Kaolin fill. (barren (75° LCA). Adjacent in wall rock are fine fractures (tension gashes) which emanate at high angle to the vein.

Also have thin (1–2mm) bands of micaceous (green) material in the altered psammite ~S_0?. Core from this vein becomes bleached throughout ~ diffuse, more qtz veining

290.30 — .36 is qtz vein (55° LCA) with CO_3 + PY deposition. This X cuts and displaces a low angle (0–5° LCA) qtz vein(s)

Reverse

(?)



Shows bleaching associated with this vein

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DRILL RECORD

HOLE NO: MA 1

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	ASSAY VALUES (Analysed by)
								Further veining & fracturing with alteration halos in [illegible] "grano-" host rock from 280.7 → ~~[illegible]~~ 292.0 tall. More low angle (<CA) veining. Some showing PY [illegible] high angle qtz veining. Again angle X cuts & appears to displace low angle vein (~ reverse ?) Some PY, SB min in high angle (~70°)						
								292.0 → core is ~fresh with minor veinlets. See zones of PY disseminations.						
		290.6	293.6					Possible So at 294.6 ~ pelitic layer						
		293.6	296.6					Few qtz veins b/n 296.~~8~~1 → 297.1						
		296.6	~~298~~.6					~ 296.1 - 2 veins (qtz ± CO₃). <u>Both</u> strike parallel but dip in opposing directions (90° difference) One appears to X cut the other. 296.5 4cm thick qtz vein along one wall is coating of <u>SB</u> veining with min. To end of this interval (297.1) are ~~[illegible]~~ high angles to CA ~50–75° CA. Alteration halos irregularly developed about these veins						
		296.6	298.6					40cm core LAST TRAY As above, ~fresh, presumably minor fracturing revealing probable 'chloritic' alteration						
								END DDMA1 <u>298.6m</u>						

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HOLE NUMBER: DDH MA3 COMPANY: NOLOPO. AUST. LTD

LOCATION: MALMSBURY (PAL 19) 1:250,000 SHEET MELBOURNE 1:100,000 SHEET CASTLEMAINE

CO-ORDINATES:	COMMENCED: 20-1-87		
BEARING: 065°	COMPLETED: 28-1-87		
ATTITUDE: -45°	DRILLER: P. FALLOON		
REDUCED LEVEL: 501m	RECOVERY TECHNIQUE: WIRELINE		
LENGTH: 182.3	LOGGED BY: M.K. MACLENNAN		
HOLE SIZE: HQ (3.6-45.6) NQ (45.6-182.3)			
PURPOSE: Test for depth and strike continuation of mineralisation in the West Panama and Panmanca Lode structures			

SURVEY

DEPTH (m)	BEARING (m)	DIP
75.0	069°	-44°
124.0	071°	-42
154.0	072°	-41
179.3	072	-40

SIGNIFICANT INTERSECTIONS

FROM (m)	TO	LENGTH	DESCRIPTION
~16.0	19.5	3.5	Massive qtz veins with varying SB+PY in altered (pelitic) psammite. Faulting
~87.0	~103.0	16.0	Σ width of 50cm mineralised qtz veins in altered pel. psam. host. Minor breccia.
~160.0	168.4	8.4	Σ 15cm mineralised qtz veins in altered, partly faulted psammite

SIGNIFICANT ASSAYS

FROM	TO	LENGTH	WEIGHTED ASSAYS									
	See Table 1. (p 14)											

SIGNIFICANT CORE LOSS

FROM	TO	RECOVERY m	RECOVERY %
No significant core loss.			

COMMENTS:

Mineralisation between 87.0 → 103.0m is probably West Panama Lode

" " 160.0 → 168.0m " " to Panama Lode.

PAGE:

DRILL RECORD

HOLE NO: DD MA2

LOGGED BY: MKM

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	RECOVERY m	RECOVERY %	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)
8.6	9.0	8.6	10.1			HQ		PELITE, soft core, reasonably massive, lacking sed. structures, grey with a "green cleak" dissemination. Possibly reddened / altered. The interval is brecciated - unconsolidated b/n 8.8 → 8.85 and 8.95 → 9.0
		10.1	11.0					
9.0	11.1							Dominantly PSAMMITIC although is a pelitic component irregularly developed. The interval is largely brecciated into fragments 4-5cm to (rock) fine grained unconsolidated material. The psammite is intensely altered with clay - kaolin products on fragment surfaces. Throughout the more solid psammitic core sericitic alteration is common. Being brecciated, indicates faulting / shearing of the country rock which suggests the introduction of mica / clay mineralogy is from fluids rather than surface weathering. Presence of qtz veins (2-4mm) throughout the interval (low intensity) is in agreement with this. Surface dustings of fine PY is common along fracture or fragment surfaces. Veins are extensional or enriched by perpendicular to vein wall qtz fibre.
11.1	11.3	11.0	12.1					Soft (altered) PELITE, fractured.
11.3	12.1	12.1	13.1	0.9				PSAMMITE, altered, is soft, has a overall diffuse bleaching with overprinting distinct alteration halos about fractures.
		13.1	14.1	0.9				
		14.1	14.7	0.6				
12.1	12.3							PELITIC PSAMMITE is soft & strongly bleached. The interval is brecciated with lesser fragments showing lines (parallel) of fine PY ± pervasive following fractures or S0 planes (vein Rock?). Are slickensided lineations on rare surfaces

Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by)

DRILL RECORD

HOLE NO: MH2

LOGGED BY: MKM

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	RECOVERY m	RECOVERY %	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES Weathering, Alteration, Fracturing, Veining, Mineralisation
								parallel to the PY stringers (⇒ Fracture controlled.) Stringers ≈ 45° cal with slickensides being sub parallel with the core ⇒ Normal for Reverse (not strike-slip - be at high angles to core ⊥ fracture plane.
12.3	12.65							PSAMMITE, bleached with minor fractures & alteration halos. Fragmented b/n 12.55 → 12.65 Again with Kaolin (type coating & some PY (short) "lines"
12.65	13.9							(PELITIC) PSAMMITE. Dominantly siliceous although has a mud component. - Bleached with some disseminations of green grains.
13.9	14.2							PELITE Obvious mud laminations. To interval is bleached with a highly altered breccia zone b/n 13.9 → 14.1 Irregular fragments ≤ 4cm of soft altered (Kaolin) product.
	14.85							
14.2								PSAMMITE So RE → 350 68W → 350 altered (bleached) with introduction of significant clay content via alteration fluids. Brecciated with exposed qtz vein surfaces with PY min in alteration envelopes (distinct or diffuse alteration) PY also present.
		14.7	16.1					From 14.7 → 16.95 Psammite shows a yellow alteration is still soft. Grey altered psamm.
		16.1	16.7					is partly brecciated b/n 15.2 → 16.85
		16.7	17.2					
		17.2	17.85					* This interval consists of qtz veins often in a dominantly Kaolinitic (sericitic) host (inherited alteration of psamm.) These zones are unconsolidated. Within & in adjacent wall rock is considerable PY (ASP. 5%) mineralisation

↳ Pyrite. 2-3mm grains

DRILL RECORD

HOLE NO: MA 2

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by) ANALABS: Au (ppm)	Sb (ppm)
~~15.85~~		15													
15.85	16.8							PELITE, strongly altered (soft) → Kaolin. B/n 16.1 → 16.7 core is brecciated with fragments (≤4cm) → unconsolidated clay.							
							1A	Qtz vein (~mineralised) b/n ~16.6 → 16.72. This also brecciated indicating POST min deformation	87011	16.6	16.7			0.383	8
16.8	17.20							SILICEOUS PELITE is an increase in silica from previous interval, core is reasonably solid although some brecciation + fracturing evident. This is yellow-cream bleached with some Py (fine) disseminations							
17.20	17.26						1A Loose	QUARTZ interval, Again a brecciated vein. Is potential min. qtz. Possibly may have been derived from vein above (16.6 – 16.72)	87012	17.2	17.26			0.408	8
17.26	18.1							SILICEOUS PELITE continues past qtz interval. As above has yellow-cream alteration. Core is generally brecciated with intense fault/shear zone b/n ~17.65 → 17.75. Is a qtz vein (crumbly) in this zone. Another qtz (vein) at 17.85 fragment (from above vein(s))							
18.1	24.0							(PELITIC) PSAMMITE has a diffuse bleaching with more distinct alteration bands overprinting ~A set of fine (about fractures – ~45° to CA							
		17.75	19.1					At 19.1, Broken qtz interval in Psamm ~5cm							
		19.1	20.0				1A	prior, core became more strongly altered. The qtz has Sb min. Psammitic core is ~solid from 19.4 although retains diffuse alteration + distinct alt. bands about qtz vein(s) + fractures. Vein(s) is occasional, 5mm wide with fine Sb min along vein walls. Planar vein?	87013	19.1	19.14			0.833	55
		20.0	21.85												

DRILL RECORD

HOLE NO: MA2

LOGGED BY: MKM

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	RECOVERY m	RECOVERY %	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES Weathering, Alteration, Fracturing, Veining, Mineralisation
								at ~20° CA and is Xcut by fractures with alteration (yellow-green) halos. From 19.6 psammite to ~ more fresh → 20.2 Alteration (halos) + fractures increase in density from 20.2 and at 20.3 → .4 core is Geccicted Core ~fresh to 21.8.
								* Appears now to have passed through the significant intersection of faulting/shearing, alteration and mineralisation. Since coring began, core has shown evidence of fluid ingress + fracturing. Most dominant interval is 6/m ~16.0 → 19.5 m. Pan1 66 is likely Panama Reef (?)
		21.85	22.85					At 21.8 psammitic core again became bleached (→yellow) with Kaolin coating on some fractures. Core mineralised (QV + SB) veins (Qtz) at ~2 Bo's. One with obvious mica strikes 11 → clips apparent direction to quartz (mica?)
		22.85	24.45					
		24.45	25.1					
24.0	29.2							PSAMMITIC PELITE (A progress increase in mud since previous interval although core still maintains v grey, structureless (SB) appearance. Is noticeably softer however without evidence for significant alteration.
								Is a mineralised vein at 24.1 (1 cm wide (↑ clay CO3 content) with QV (+SB) Also throughout this interval is the green, fine grain mineralogy (?)
								Good Soil Taken at 25.6 85E → 350 15W → 350

Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by)

DRILL RECORD

HOLE NO: MA2

LOGGED BY: MKM

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	RECOVERY m	RECOVERY %	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)
		25.1	26.6					Pelitic core continues into Tay 6 - laminations irregularly developed, whilst green (~~sericite~~ mineral still prominent 8/a 27.4 - 27.55 is a brecciated zone which shows alteration & fragmented qtz veins (mineralised & white opaques (FeO?)) So at 28.2 (laminations?) 82° → 350 4° → 350 ~horiz.
		26.6	28.1					
		28.1	29.1					
		29.1	29.6					
								Brecciation 8/a 28.5 → 29.0m Core is altered with kaolin & sericite in v6 more solid core sections & Fragmented qtz throughout breccia Minor evidence for Mineralisation
29.2	33.6							PSAMMITE relatively coarse grained with areas of bleaching / Breccia 8/a 29.5 → 29.6
								with exposed qtz veins (minin) in unconsolidated clay host
								Brecciated psammitic core with Kaolin / sericite alteration 8/a 30.1 → .4 30.6 → .9 31.1 → .3
		29.6	30.4					
		30.4	31.1					
		31.1	32.75					
								where brecciation intense get unconsolidated clay material - qtz fragments & minor mica also seen in v6 fault zones
								- is pelitic interval 8/a 31.4 — .6
								In ~~solid~~ psammitic core 8/a breccia zone, intensely & reasonably fresh with alteration restricted to wall halos about fractures & veins
								At 32.85 Strong bleaching with an associated 4 mm vein of qtz with a high angle of dip? (84?) (55° LCA)

Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by) Au		Sb					
87014	29.56	29.6			0.417	25						

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DRILL RECORD

HOLE NO: MA2

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	Core Description / Special Features
				* This sheared altered & mineralised interval may be associated with ×6 previously described fault (?)
		32.75	33.95	(Alteration continues into tray 8)
		33.95	35.1	Psammite (bleached) and brecciated
		35.1	35.9	b/n 33.4 → .6. Is considerable clay content ~ material is partially unconsolidated ~ introduced through fluid
3[illegible]	35.0			PELITIC PSAMMITE is fine grained & shows yellow – cream bleaching to 33.9. Minor Brecciation at 33.92 2cm wide qtz vein ~55° LCA has minor PY, SB (CPY, ASP) mineralisation. Surface of vein is black host, mildly graphitic. Brecciation b/n 33.95 → ~34.1. More high angle (~?LCA) veins between 34.2 → 34.5 Host is altered. Adjacent to a vein is a cataclastic band ~1cm wide which includes qtz fragments in a black soft host ~graphite? ~> continued movement along fracture
				Possible pelitic laminations at ~34.7 So 83° → 350 ~10°E → 350
				35.2 Xcutting veins: 1) veinlet (≤1mm) qtz with ~ PY (35°) min at 40° LCA is XCUT by 2) 4-6mm qtz vein with PY min ~10° LCA. Both have alteration halo's ~ up to 1cm. Adjacent is an irregular fracture with ASP deposition.

(Survey 1) 75 m

DRILL RECORD

HOLE NO: MA 2

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by)
35.0	36.4							PSAMMITE 'Frator' lithology with fine alteration bands. Bh ~~35~~ 35.8 – 7.9 is breccia zone including fragmented qtz – possible minor SB						
36								36.3 Qtz vein, prominent planar 1.5 cm wide with minor PY SB min. – ~~Refer for~~ 62^E → 348						
36.4	36.6							PELITIC PSAMMITE Probable mud increase → laminations is possibly jnt bleaching about fine fracture set (?) So 87^E → 350; – ~4^E → 350						
36.6	36.8	35.9	37.1					PSAMMITE (slight mud)						
36.8	37.1	37.1	38.0					PELITIC PSAMMITE Partly bleached with fine green grains disseminated throughout						
		38.0	40.1											
37.1	40.0							PSAMMITE Generally fresh does have minor pelitic laminations + Qtz veining 1) at 39.0 1cm wide with PY mi.. lining of PY only recognise on fracture surface there was a dusting of PY in section – appears as a black fine minor alteration halo associated at 5° TCA. This X cuts a veinlet 3mm (min?) with relatively large halo (2cm) – 65° TCA → later fluids more equilibrated with host rock. At 40.0 – 7.1 is unconsolidated (faulted) zone of clay – psammite material						
40								(PELITIC) PSAMMITE; bleached zone (?) So 70^N → 350; 12^W → 350						
								Mineralised vein here –20°						

DRILL RECORD

HOLE NO: MA 2

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by)
		40.1	41.2					Psammite interval 10 Now largely fresh. Probably						
		41.2	43.1					finished intersection of bleaching/alteration +						
								min been irregularly developed since start.						
								Is minor brecciation b/n 41.1 → 7.7.						
								Psammite slightly bleached here. ~Alteration						
								also at 40.4 with an associated 1.5 cm						
								qtz vein some Py/ min						
								* EX. So b/n coarse grained +						
								fine grained PSAMMITE at 42m						
								80E → 350 | .01(C)						
								~10E → 350						
								Is sharp contact b/n fine + coarse →						
								younging to top						
		43.1	44.6					7cm Vuggy zone of strong yellow-orange						
		44.6	45.6					bleaching at 45.0. Breccia b/n 45.4—4.6 →?						
								~Fragments of solid PSAMM are bleached						
						END ~~AQ~~		with some surfaces dusted in fine PY.						
		45.6	48.1			NQ		Bleached + partly brecciated psammite b/n 45.60						
		48.1	51.45					→ 45.9 Consistent alteration throughout with						
								minor PY dustings on some surfaces						
								Bleached again b/n 46.1 → 47.9						
								Is zone of a greater clay content: either						
								reflecting original pelitic comp. OR introduced						
								clay components ~~during~~ by later min. fluids						
								47.2 → 3 Shear/fault zone. Unconsolidated						
								soft clay material						
								From 47.9 / Fresh psammite with distinct						
								narrow 2m → 1.5cm alteration halos						
								associated with fractures some veinlets						
								~49.8 2 // veinlets (3mm) at 75° LCA +ncH						
								X cut a fracture (veinlet) at 15° LCA (+ncH)						

DRILL RECORD

HOLE NO: MA2

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by)
								At 49.8 thick, 1.5cm planar qtz vein (barren) X cuts an alteration zone. NOT associated with this vein. This vein no (minimal) alteration vein = ~40° LCA						
		51.15	54.2											
		54.2						At 51.4 is a 1.2cm wide qtz vein with a relatively high PY content. Aggregates up to 1cm wide. ~40° LCA. Associated with this vein is an interval of alteration in the psammitic core. Core is bleached with disseminated aggregates (≤2mm) of PY, PY also in fracture [illegible] lines						
								~Pelite increase in core b/w 51.6 → ~53.1. Faint diffuse light coloured bands						
								Still throughout the core (most noticeable in yellow (bleached) bands/beds) is disseminated grains of a green mineral.						
								Minor fracturing (30° → 50° LCA) & alteration zones.						
								Veinlet at ~56.0m 0-5° LCA with some PY min						
								End Tray 13 at 57.10m						
		54.2	57.25					At 57.3 is a 2cm vein planar ~90° LCA, no obvious min. does have a diffuse alt. halo.						
		57.25	60.5					Psammite still fresh although still getting bleached diffuse laminations (15°?)						
								58.6 qtz vein with PY min 1.5 cm thick, vuggy (35-40° LCA) with alteration halo 2-3 cm wide including PY (≤2mm grains) dissem.						
59.1	59.4							PSAMMITIC PELITE. Fine laminations (light) a general orientation although appears are X 50						

DRILL RECORD

HOLE NO: MA 2

LOGGED BY: MKM

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by)
								relationships:						
								V/S S_0 72^W → 350						
								6^E → 350						
59.4								PSAMMITE (with some minor more politic						
								zones. Is overall fresh.						
								- At 60.2 is a 1.5						
								planar vein at ~25° LCA with a cataclastic						
								appearance. Although vein (zone) is solid it also						
								contains fragments of host rock (altered						
								psam + PY dissem) also fragmented qtz + (minor PY?)						
								- Closed framework in a matrix of fine						
								grained clay (sericite); possible CO_3 in						
								vein also. This vein X cuts a small						
								veinlet (Qtz) at 50° LCA. A zone of alteration						
								is associated with this vein						
								Alteration zone of 61.8 → 62.0						
								- Bleached core with dark grain disseminations						
								(PY). Couple of veins + fractures with PY						
								min along - 45° LCA						
								X cutting veinlets parallel to zone.						
								Both 1-2 mm wide, planar striking small						
								dipping opposite directions both ~45° LCA.						
		60.3	63.1					Tray 15 all PSAMMITE. minor politic increase						
		63.1	66.4					(w/ laminations) b/n 64.7-.9.						
								B/n 64.3 → .6 is an altered						
								brecciated zone (faulting) again is significant						
								increase in clay (kaolin coated fragments)						
								resulting from alt. fluids - No evident qtz						
								or MIN						
								Grain size (WTT) variation in Psammite						
								provides FY S_0 relationship (coarse on top sharp)						
								68.26 68^W → 350 4^E → 350						

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DRILL RECORD

HOLE NO: MA2

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES Weathering, Alteration, Fracturing, Veining, Mineralisation	Sample No.	From (m)	To (m)	Recovery m	Recovery %	ASSAY VALUES (Analysed by)
		66.4	69.45											
		69.45	72.5											

[This tray (15) fresh (as mentioned) with minor fracturing / veining]

(Tray 16, increased prop of alt with core brea)

Diffuse bleaching of psammitic core b/n 68.9 → ~69.2. Probable small fault at 69.2 as evidenced by fragmented unconsolidated core.

Some fracturing / veinlets with alt. halos in ~fresh host to 70.2 (~~alt~~ 2→

B/n 69.2 → .3 is band of coarser grained psamm. with x6 white opaque grains as seen in previous hole (MA1) ~igneous texture.

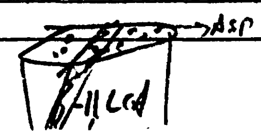
At 70.2 → .4 core strongly bleached (yellow) in coarse psamm. 7mm qtz vein here ~80° LCA planar with relatively high propn of CPY : PY.

Core brecciated b/n 70.3 → 74. less intense bleaching continues to 72.1m. The coarse psamm ("granite") seen above also continues to this depth also. Core b/n 71.6 → .8 is fractured // to LCA (down middle) + this gives way to breccia zone b/n 71.8 → 72.1.

~~Fresh core from 72.1~~

72.6→73 1cm thick qtz vein ~// to LCA planar with relatively minor alteration associated containing ?? minor PY + SB (<1%).

This vein cut by a fracture (~core surface) at 80-90° LCA. On exposed face are coarse ≤3mm ASP grains Euhedral. These grown on host rock (altered surface) NO associated qtz



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DRILL RECORD

HOLE NO: MA2

LOGGED BY: MKM

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by)
		72.5	75.55											
		75.55	78.6											

73.1 Couple of other veinlets, qtz (mic?) X cutting

Also four a possible? S₀ lamination

S₀ 78 W → 350] 2 W → 350

① Vein (// LCA above) 45 E → 348

② 63 W → 340

③ 80 NW → 028 } 73.1

(Alteration halos about fracture + veins to end of frag (74.6) at 74.8 is parallel high angle fracture to LCA (~60° LCA) with coarse sub → euhedral ASP (PY) grains 1-3 mm.

~Fresh psammitic core continues to 76.15 is fine grained with occasional high angle veinlets (//→LCA) 1-2 mm wide with 1 cm alteration halos. Are some (2) veinlets at ~15° LCA.

From 76.15 core becomes bleached (lighter colour). From 76.2 core is v. coarse grained psammite (igneous type texture). Dom. qtz grains 1-2 mm (uniform) with some similar size an-subhedral white [illegible]. Although is closed framework, a matrix of fine grained white mica (clay). This interval of coarse sst is bleached + partly brecciated at ~76.8

Is a sharp contact b/n this coarse qtz unit + fine grained unit at 77.2. The fine grained core remains altered to 77.4 → then grades into fresh core. ⇒ Bleaching appears associated with v. coarse unit, however is no obvious fluid channels in proximity. Core is

DRILL RECORD

HOLE NO: MA2

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by)
								Fractured at ~75° LCA ~ probable jointing						
								Fresh fine grained core (~10 cm interval of ~~fresh~~ coarse unit) → 77.9						
								(Contains minor fracturing, some veins) with distinct alteration halos						
								At 77.9 ~~grades~~ sharp contact with X6 coarse unit again						
								GOOD SO 76^W → 350; 4^E → 350						
								Coarse grained sst (1-3mm grains) to 78.8 - Again, as previous interval is bleached NOT as consistent ~ irregular diffuse patterns. Minor fracturing.						
								From 78.8 Fine grained with some small (~2-3 cm ~~thi~~ layers (irregular) bands of to coarse unit. Fine grained psam largely bleached to ~79.8 becomes fresh, grain size becomes coarser than 'fine' grained (NOT as coarse as other)						
								* This interval got significant variation in grain size of qtz rich (psammite) unit						
								2 // qtz (py) veins at 80.2 ~35° LCA. No associated alteration						
		78.6	81.65											
		81.65	84.7					Moderately coarse grained psammite continues into Tray 18. Is fresh ~~[illegible]~~						
								* At 81.2 EX SO between this ~coarse + ~~fine~~ fine grained units						
								(EX) SO 80 → 350; 12^E → 350						
								~~This is a sharp contact but then~~ grades into X6 coarser unit ~15 cm below						
								⇒ YOUNGING to X6 TOP.						

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DRILL RECORD

HOLE NO: MA2

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Au	Sb
								The coarser unit → ~86.6.							
								At 83.55 is zone (5cm) of soft fragmented / unconsolidated clay / psammitic material - obvious alteration to ?sericite qtz. From this depth core becomes 'slightly' irregularly bleached.							
								B/n 84.25 → .65 is 4 ~ 1cm qtz veins (mineralised). 2) Subparallel, 35-40° LCA coarse qtz with fibre growth normal to vein wall (EXTENSIONAL). 1) another strikes subll dips ?angle to LCA ~ 75°. PY (SB?) min in vein 3.							
							A	This interval represents relatively high density qtz veins of considerable thickness (& min) is PY dissemination in alteration about veins. Core gradually becomes fresh into vein (coarse (mod.) grained psamm (grains ≤ 1mm → NOT "THE" coarse unit). Some minor "more pelitic" laminations -	87015	84.3	84.45			0.267	7
		84.7	87.75					Moderate coarse grained psammite all thru 19. Contains coarser unit 1-3mm grains (before) + minor more pelitic laminations. Whole thru is bleached to varying degrees. From ~87 psamm is considerably altered.							
		87.75	90.8					Qtz veins - 1) 89.8 7mm planar 15° LCA minor PY (laggregated) on vein wall							
							A	2) 91.5 6cm qtz vein with PY (CPY? SB?) min	87016	91.55	91.6			0.483	330

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DRILL RECORD

HOLE NO: MA 2

LOGGED BY: MKM

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by) Au	Sb
								Although vein is fractured now is obviously							
								significant - size & prop^n of sulphide(s)							
								As in an alteration zone (since 87)							
								Are some irregular qtz veinlets emigrating							
								from this vein. The vein is ~45° LCA							
								~~The~~ ~~[illegible]~~							
								Further veining bgrnd + with min							
								evident in bleached coarser unit b/n							
								92.8 → 93.1							
		90.8	91.85					Irregular qtz veinlets in coarse bleached							
	94.15	91.85	96.9					psammite → 93.67							
93.7	93.92							QTZ interval This thick qtz interval	87017	93.7	94.1			0.275	10
								has dubious geometry against host							
								rock and then V is a V vein, planar							
								40-45° LCA. The qtz is massive with no							
								coarse grained vuggy textures. Very minor							
								SB min. Adjacent veins (lets) & host rock							
								have coarse 1-2mm grains of PY, ASP+SB							
								Below thick vein is a set of qtz							
								veins (1—4mm thick high density &							
								11 to the thick (~25cm) vein.							
94.15								⇒ Same structural control (fractures)							
93.92								PSAMMITE. ~~very~~ varies b/n fine → med→coarse							
								grained. Below the thick qtz vein, stays							
								bleached → 94.25 Within this zone are							
								other veins. ~No min although see PY in							
								host rock - disseminations & solid veinlets.							
								From 94.25 → 95.2, psamm is							
								relatively unaltered still shows minor fractures with							
								thin alt. halos							
								Becomes increasingly altered from 95.2							
								- Halos about fractures - veinlets ↑ density							

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DRILL RECORD

HOLE NO: MA 2

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by) Au	Sb
								Slight increase in pelitic component b/w 95.4 → .7 (introduction from fluids?)							
								B/w 95.6 → .8 is a breccia zone sharp fragments NOT in the - puggy type zone							
							A	B/w 97 → 97.4 is a set of // qtz veins 0.4 → 1.2 cm thick planar with one (middle one at ~97.2) have significant propn of SB (+ PY) other veins appear barren							
								Core becomes 'fresh' after 97.4 → 97.95							
								From 97.95 → 98.2 is zone of ↑ density random network of fracture + alteration halos. Couple of larger fractures along which the core is broken. Cot PY in this zone - in host.							
								→ ~Fresh to end of box							
								At 99.25 is 8mm qtz vein planar at ~85° LCA with lines of SB // to the vein wall, + in close proximity to wall							
							A	At 99.3 → .35 is qtz vein ~10cm thick with considerable SB min.	87018	99.29	99.35			0.333	30
								The large alteration zones + relatively thick qtz veins (+ min) could represent the intersection of the W PANAMA reef							

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DRILL RECORD

HOLE NO: MA 2

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by)
		96.9	99.65					Qtz fragment at start of tray 21 (probably						
		99.65	103.0					from vein at 99.25 / .35)						
								Section of qtz shows 1cm						
								vein with SB lining the walls intersected						
								by a vein with PY through it						
								Qtz veins at 100.25 with SB + PY min						
								→ MA Note Book A, p 9						
								Core is still PSAMMITIC although						
								minor (probably) pelitic laminations						
								Core bleached by alt halos [illegible] density						
								(about fracturing) & some veins, barren.						
								2 ~~to~~ 8mm wide, planar 70° LCA.						
								Qtz vein 102.85 1cm wide, 70-80° LCA						
								Barren (1-2 grains SB) BUT in adjacent wall						
								rock is PY + SB min. Alteration significant						
								about this vein						
								From 103.0 → end of tray						
								Psammite is fresh with minor fracturing						
								& alt. halos. Unit is fine grained						
								Qtz vein at 104.4 85° LCA, 4mm wide						
								w/ some PY + SB min						
								1cm qtz vein at 105.3 planar 30° LCA						
								is X cut by two fractures, irregular, probably						
								filled with PY? (black lines) concentrated at						
								dip line of vein; continuous from host rock.						
		103.0	106.5					→ all tray 22						
		106.5	~~108.8~~					(Psammite continues) Fine grained & fresh						
			108.8					- alt halos about fractures & veins.						
								local density to mottle structures						
								- 1cm vein at 106.45 is planar 45° LCA						
								- vuggy with coarse 1-2mm grains						
								of euhedral ?PY in vug cavities (minor SB)						

DRILL RECORD

HOLE NO: MA 2

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by)
								3 cm alteration zone about this vein						
								At 110.8 → 111.0 psammite (+ pelite?) is bleached yellow-cream, smooth, has pelitic texture. Could be [illegible] layer of pelite. Softer also than adjacent [illegible] psammite → altered psam, ? introduction of clay in fluids?						
		109.7	112.05					[Tray 23 all fresh, fine grained PSAMMITE]						
		112.05	115.2					Minor alteration zones - 112.95 Qtz vein 5mm wide + PY.						
								Is a narrow (fault) zone at 116.4 where core broken revealing altered clay surface (~1 cm wide). No vein associated.						
								Other (few) fractures + alteration halos at varying angles to ∢6 LCA.						
		115.2	118.25					Fresh psammitic rock → 118.15. At 117.7 →.9 are couple of ‖ planar qtz veins (with CO_3) + alteration - distinct halo on fresh lithology						
		118.25	121.3					- B/h 118.15 → 118.85 All core is bleached containing fractures + minor veins.						
								118.65 is a 4 cm wide band qtz vein (+CO_3) containing angular fragments of country rock. These range from 3 cm → 3.5 cm, are generally elongate + aligned ‖ to ∢6 the vein wall. No evident mineralisation.						
								3 thick (1.5 → 4 cm) qtz veins,						

DRILL RECORD

HOLE NO: MA 2

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by)
								b/w 120.4 → .9 . Minor mineralisation (PY + ~SB) in the narrow (1.5 & 3 cm veins) Minimal alteration about the vein in the. Fresh core.						
		121.3	124.35					[All interval fine grained PSAMMITE]						
		124.35	127.4					Tray 25						
								All FRESH except b/w 124.9 → 125 is bleached band, softer more pelitic in composition (introduced ?)						
								-126.0 → 126.5 Large white ~ green zone, consolidated. Core is cleaved along 2 subll fractures 35° LCA: Minor PY dustings on the. - Only obvious channel way for fluid.						
								At 128.6 5 mm qtz vein, planar ~ PY minor alt. cross cuts a fracture with a wider alt. halo. ~20° angle b/w ∪ tolo both dip opposite directions						
								Again the latter feature is in greater equilibrium with the wall rock						
		127.4	130.45					[All interval fine grained PSAM; generally fresh some alt.]						
		130.45	133.5					· Minor fracturing + veinlets → 131.38. From here is probably increase in pelite although no distinct So structures → 131.5						
								From 131.5 to end of tray all psam						
								132 - Fracturing & veins						
								Fracture with ≤0.5 mm of clay fill / cm alt. halo is ∥ to LCA - can be traced for ~1 m down hole. This is XCUT by a 3 mm qtz veinlet at 45° LCA, minimal alt						

DRILL RECORD

HOLE NO: MA 2

LOGGED BY: MKM

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES Weathering, Alteration, Fracturing, Veining, Mineralisation	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by)
								Tracing this fracture (11) down core, another 11 LCA fracture with alt. halo develops so coupled with PY at T angles - jointing or fracture at ~high angles to 11 get cleaves to core into angular fragments.						
								11 to low angle fractures (0~10°) continue down core → 134.7. And are occasionally (Xcut) by veins(lets) with ~NO alteration						
		133.5	136.55											
		136.55	139.4					(PSAMM cont. →) Qtz vein 6mm with ~SB min at 45° LCA.						
								Bleaching of core from 136.55 → 137.1 Generally associated with fractures-veinlets						
								136.8 4 mm qtz vein ~50° LCA - barren.						
								136.9 1 → 1.5 cm qtz vein which divides into 2 down dip. Strikes (same) 11 with above vein, dips in opposite direction ~30 LCA. Has SB deposited irregularly along wall subhedral. PY ~ along wall within vein also						
								11 → SB early in paragenesis						
								137.4 → .9 Fracture with alt halo - 5° LCA (similar to above) Again, got small zones of angular fragments due to intersecting fractures						
								~Slight increase in clay component (introduced?)						
								B/n 139.0 → 139.3 Core here is yellow-cream bleached with ~~small~~ thin soft unconsolidated zone (1 cm wide - small fault).						

DRILL RECORD

HOLE NO: MA2

LOGGED BY: MKM

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by)
								Qtz veining b/n 139.55 → 139.7 in ~fresh psammite ~2, ~15° LCA, been fractured post qtz dep.						
								Bleaching b/n 140.1 → 140.3. Mostly noncolal with a voggy coarse grained qtz vein 6mm with minor PY deposition						
								b/n 140.42 → 140.65 Strong, intense zone of alteration, still hard, white-grey colour. Is one qtz vein in middle of alt zone. Extension zone for vein?						
								// Fracturing zone b/n 140.7 → .9 no alt. halo but fracture surfaces has a clay (Kaolin) type coating - evidence of fluid movement (ground water?)						
		139.6	142.65											
		142.65	145.7					Again intersecting ? angle fractures cursed ~ fragmentation of core b/n 14.1 → .25. Core unaltered, no qtz/min						
142.3	142.8							PSAMMITIC PELITE Although this zone is bleached distinct laminations & a ? ~ pelitic lithology (softer also)						
								S0 81° → 350						
								~2° → 350						
								§ Breccia ~ Kaolin altered chips (unconsolidated) at 142.7 → .75						
142.8								PSAMMITE ~ bleached → 140.2						
								143.1 → .4 Brecciated ~~4~~ 4cm angular fragments with low intensity alteration						
								Further ~ // LCA fracturing at 143.6. Also here X cutting veinlets (≤1mm).						

DRILL RECORD

HOLE NO: MA2

LOGGED BY: MKM

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES Weathering, Alteration, Fracturing, Veining, Mineralisation	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by)
								– Strike // but dip at opposite direction ~50° 6/m veinlets. Both have narrow alteration halo's.						
								Altered zones at – 144.95 (more pelitic facies) – 145.2						
								Both ~5cm wide						
								Fresh core from 145.4. Psammite coarser grained → SHARP contact with finer grained unit at 146.15						
								EX 50						
								14^w → 350 2^w → 350						
								To fine grained unit grades into the coarser unit again ~146.8						
		145.7	148.75											
		148.75	151.8					Coarse grained (qtz <1mm, white opaques = 1-2mm) continues → Tray 29						
								Zone of alteration at 147.5 → 148.2						
								Network of alt halos + larger zones associated with veining						
								1) 1-2 mm qtz vein with 'strings' of fine PY // to vein wall, 0-5° LCA + alt halo						
								2) veinlet (<1mm) some coarse PY grains 40° LCA. 1) X CUTS 2).						
								3) Qtz vein 7mm barren, sub // to 1). This vein X cuts + displaces 1)						
								– Displacement ~ 3-5 mm in REVERSE sense						
								→ 3 generations of veining						
								2) 2+3 ~//						
								+ 1 ↗ angle (// LCA)						

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DRILL RECORD

HOLE NO: MA2

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)
								Fine grained psamm. from 147.9
								149.5 → 7.7 Zone of distinct alteration
								against fresh psamm. Are a set of (sub) ‖
								qtz veins ± min ~ 5mm thick at 80-90°
								LCA.
								150.3 → 7.45 Another zone of bleached psamm.
								This interval alt. is associated with a set
								(3) veins ‖, 40° LCA – barren, on a surface
								of broken core (along vein wall) is
								crust. ~ coarse grained white mica - muscovite
								flakes
								2cm away from the layer of three
								veins (4mm) is a set of fine, 1-3cm long
								irregular fractures – black lines – solid? Riedels
								and tension gashes from the vein (40° to vein)
								Minor fracturing + some veinlets +
								alt. halo – end of tray 29.
								(At ~152.1 1-2cm interval of banded chert
								type material. Psammite still contains disseminations
								of green grains (consistent), most (only?)
								abundant in alteration/bleached zones
								Tray 29 end 153.6
		151.9	154.84					Bleached (strong) zone b/n 154.7 → 7.8 (yellow-cream)
								in fresh psammite ~ source of fluid perhaps
								fracture at 5° LCA through this zone
								154.9 Qtz/CO3 veinlet with alteration halo
								~PY min; on broken core face adjacent to vein,
								coarse 1-2mm euhedral PY deposited
								From 154.9 → ~156.5 increase in
								fracture + veinlets with distinct alt halo's
								one set fractures (≤0.5mm qtz/CO3 py? fill)

DRILL RECORD

HOLE NO: MA 2

LOGGED BY: MKM

Recovery From (m)	Recovery To (m)
157.9	160.95
160.9	164.0

These fractures ~30-40° LCA.

2nd set, qtz veins 3-4mm, barren at 45° LCA.

Further (minor) veining, fracturing & increasing density towards end of tray. Veins getting wider, up to 1cm, and at higher angle (~50-70° LCA). Core still relatively fresh to 159.0.

From 159 pale green-white bleaching (consistent) through psammite (sericitic).

A qtz vein (4mm) can be traced from 159.0 → 159.8, forms 0-5° LCA and has ≥3 cm alt halo, partly vuggy with only few fine PY / SB grains seen. This 'pm' vein cuts & displaces a set of 4-5mm qtz veins at 45° LCA. Displacement (5mm) is possibly REVERSE - difficult to determine owing to 'vertical' nature of low angle vein.

Some of the 45° veins have high prop^n of PY (CPY). Core altered entirely through this interval of intersecting veins: low angle vein & vein sets strike at ~90°.

160.15 strong (yellow) alteration to 160.45.

A set of 3 ‖ (qtz) PY/CPY veins ~40° LCA.

160.45 – 161.15 less intense (common greenish) alteration - More associated qtz veins appear to be barren. 2 generations 60° LCA milky 7mm vein X cuts 30° LCA veinlet.

At 161.15 is a 1cm vein at 90° LCA with minor PY

DRILL RECORD

HOLE NO: MA2

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES Weathering, Alteration, Fracturing, Veining, Mineralisation	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by) Au	Sn
								From 161.5 → 163.4 More alteration about							
								veins, but generally core is relatively fresh							
								Veins ~ 40/-60° 3mm → 1.2 cm thick, most							
								contain some mineralisation + white-yellow opaque							
								One vein seen to displace fracture							
								(veinlet) by 5mm in REVERSE sense							
								Also 2 veins with relatively large							
								alteration (- 3-4 cm wide) halo's. Two have							
								irregular / jagged edges where fluid							
								entered ~~with~~ fractures. all through core							
							A	163.4 → 8 Intense bleaching about veins							
								+ fracturing. Core is partly brecciated, most	87019	163.25	163.6			0.242	8
								probably due to intersecting fractures + veins							
								4 veins in this zone - show minor							
								PY/SB min. Through to alteration get							
								occasional solid veinlet of (fine) PY. PY							
								disseminations also in wall rock.							
								Veins ~ 60-80° CCA (9 avg 6)							
								163.8 → (~~... To 31~~)							
								→ 166.2 Core is less altered. ~~Alt~~							
								Alt. halo's ~~are~~ only prominent about low angle							
								0-5° CCA fractures.							
							A	* At 164.1 is 1 cm qtz vein	87020	164.15	164.27			0.475	9
								with a high propn CPY (brassy yellow)							
								~45° CCA							
		164.0	167.5												
		167.5	170.1					166.2 → .3 Bleached psammitic core with	87021	166.2	166.35			0.125	8
								disseminations of PY (spotted unit)							
							A?	166.3 qtz vein - partly brecciated							
								Qtz fragments show fine PY/SB min							
								Further qtz veining is less							
								altered core from 166.3 → 167.3 veins							

DRILL RECORD

HOLE NO: M12

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	Recovery m	Recovery %	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Au	Sb
								have ~PY (SB) mm oriented 40 → 70° LCA							
								* 167.3 → 168.35 SIGNIFICANT INTERVAL							
								Strongly bleached zone → 167.8							
								Is the yellow - cream SPOTTED unit (high prop=							
								of PY disseminations (1 → 4mm grain (aggregate)							
								couple aggregates 1cm across) Lines of PY also	87022	167.45	168.1			1.22	280
								at Qtz veins in this interval							
								One ~ 8mm thick (have broken along vein							
								wall exposing a coarse grained vuggy vein							
								* the + SIGNIFICANT Mineralisation (coarse							
								euhedral PY grains ≤4mm + larger anhedral							
								aggregates, fine sub-anhedral SB + ASP							
								Using the 'lines of PY' may represent							
								original S0 in the psammitic (-pelitic?) unit							
								using → ?? S0 74W → 350 8U → 350							
								(core) Qtz/Min vein 10E → 310							
								* 167.8 → 168.1 Soft, kaolin, grey - black material							
								- graphite - Fault zone has Qtz vein, strong							
								alteration about this unconsolidated zone							
								- within 'vuggy' zone fine clusters of PY							
								in the unconsol. material							
								168.1 → 168.45 As above interval (167.3 → 167.8)	87023	168.3	168.35			1.02	200
								Spotted (PY) bleached zone 2 veins							
								1) 1cm thick 65° LCA plane							
								2) 4cm thick ~ Tangle(?)							
								* Both have PY/SB mm → 173.2							
								From 168.45 psammite becomes							
								(relatively) fresh, low density of brittle structures							
		170.1	173.15												
		173.15						* The above interactions (min/alt.) probably							
								represent the depth extension of the PANAMA reef							

DRILL RECORD

HOLE NO: MA2

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	Core Description / Special Features
				PY dissem. a/20
				At 173.2 →·3 is bleached zone with a 2 cm qtz vein with significant prop^n of SB (+~PY)
				Core becomes fractured due to intersecting fractures b/n 174.6 →·9 Fracture surfaces are greenish (chlorite?) with kaolin dustings
				b/n 175.4 →·7 Bleached zone with a set of // qtz vuggy veins 55° CA, minor min
		173.15	176.2	~Fresh psammitic core (minor veining - no alt).
		176.2	179.25	to 178.2
178.2	179.4			PELITIC PSAMMITE. In this interval of unaltered core, appear to be 'lighter' diffuse layers / laminations.
				SO 79W → 350 3W → 350
179.4	182.3			PSAMMITE
		179.25	182.3	At 182.0 →·05 small zone of alteration with PY disseminations, core partly fragmented (→ intersecting fractures, low density) with fragments having ~ dustings of PY. Some barren qtz also here?
				END DDH MA2 182.3m

HOLE NUMBER: DDH MA3 COMPANY: MOLOPO AUST. LTD.

LOCATION: MALMSBURY (PAL 19) 1:250,000 SHEET MELBOURNE 1:100,000 SHEET CASTLEMAINE

CO-ORDINATES:	COMMENCED: 29-1-87
BEARING: 235°	COMPLETED: 11-2-87
ATTITUDE: ~~-58~~ -53	DRILLER: P. FALCOON
REDUCED LEVEL: 564.8	RECOVERY TECHNIQUE: WIRELINE
LENGTH: 260.65	LOGGED BY: M.K. MACLENNAN
HOLE SIZE: HQ (18.0 → 118.25) NQ (118.25-260.65)	

PURPOSE:
Test for depth continuation of mineralisation on Missing Link lode structure.
Test for depth and strike continuation of mineralisation on Panama Lode.

SURVEY

DEPTH (m)	BEARING (mag)	DIP
78.1	235°	-55°
143.0	237°	-52°
197.35	237°	-50°
254.65	239°	-48°s

SIGNIFICANT INTERSECTIONS

FROM (m)	TO	LENGTH	DESCRIPTION
109.0	123.0	14.0	≤70 cm mineralised qtz (PY+SB) in irregularly bleached pelitic psammite ~faulting
133.0	134.1	1.1	≤11 cm mineralised qtz (PY+SB) veins; including brecciated qtz and host rocks
165	187	22	≤60 cm mineralised qtz veins in irregularly altered, fine to coarse psammite

SIGNIFICANT ASSAYS

FROM	TO	LENGTH	WEIGHTED ASSAYS									
	See Table 1 (p 14)											

SIGNIFICANT CORE LOSS

FROM	TO	RECOVERY m	RECOVERY %
No significant core loss.			

COMMENTS:
Missing Link lode intersected between 109.0 and 123.0m.
Mineralisation between 165 and 187m. may represent Panama Lode.

DRILL RECORD

HOLE NO: MA3

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by)
18.0		18.0	19.6					WEATHERED BEDROCK core is soft, largely Kaolin						
		19.6	21.1					unconsolidated, consisting of haematitic / limonitic						
								clays. Is siliceous in zones (b/n 19.8 → 20.0)						
								as solid core of a harder, more siliceous						
								lithology or veins (~fragmented in						
								unconsolidated material are recognized						
								Is also ~coarse ≤1mm grains of qtz						
								within the clay units - due to weathering						
								process. Being relatively close to the surface						
								the degradation of core is attributed						
								to weathering rather than alteration via						
								hydrothermal fluids. Pelitic lithologies also						
								have a micaceous (muscovite) component.						
								The dominance of red-yellow-orange						
								mottling of clays indicates a high propn of						
								Fe in the bedrock.						
		21.1	22.6					From ~21.5 core becomes more						
		22.6	24.1					consolidated. Within tray 2, is 3 zones of ↑						
		24.1	25.6					unconsolidated material. b/n - 22.7 → .75						
								- 24.5 → .6						
								25.5 → .6						
								Now soft clay is more white (Kaolin) dominant						
								with mottles of red / orange rather than Fe						
								throughout						
								* Is a high density of qtz veins						
								qtz in this tray ~ varies ~mm's → 1.5 cm.						
								are irregular, massive + is typical of metamorphic						
								qtz. As above finer qtz grains through clay						
								give core a ~coarse texture						
		25.6	27.1					✓ This tray as above, perhaps more unconsolidated						
		27.1	28.6					again - Dominance of white-grey-red / orange clays						
								with qtz grains often in the matrix. Some interst						

DRILL RECORD

HOLE NO: MA3

LOGGED BY: MK [illegible]

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by) ANALABS PPM
								which has conglomerate texture. Again high abundance of qtz veins (↑↑ density). These are evidenced by veins themselves and broken qtz fragments → grains in the clay unit.						
								The qtz (veins) do not appear mineralised however the oxidised Fe may be from weathering in part. Doubtful since is low (≤ 2% py seen in veins in MA1+2.						
								The relative deep overburden maybe due to fact that hole is angled ~ // to with slope face ⇒ remaining in soil - weathered bedrock horizon.						
								The high density qtz veins have been seen also in road outcrops along Belltopper Rd. The density is typical of a reef structure whilst the unconsolidated material could represent faulting. The preferred conclusion is surface weathering of (~~[illegible]~~?) sediments containing ↑ density of (barren) qtz veins for reasons outlined before.						
		29.6	30.1					(Weathered Bedrock continues) The core is						
		30.1	31.6					soft but relatively consolidated. There are zones						
		32.6	33.1					of ↑ unconsolidated material (b/w ~30 → 30.15, 31.5 → 31.6, 31.67 → 31.8)						
								These zones generally shear zones however the nature of weathering from surface still indicates weathered bedrock. All lithology is still heavily limonitic / kaolin throughout with large qtz frags - is coarse grained almost similar to a weathered granite						

PAGE: 2

DRILL RECORD

HOLE NO: MA3

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Au	Sb (ppm)
								+ Fe Blu 30.6 → to an increased density of Qtz veining. Qtz vein at ~31.3 appears approx 10 cm thick. Other randomised veins (≤3cm) are ~45° LCA. The qtz is massive and appears barren (buck qtz). * Again relationship b/n ↑ weathered (altered?) material, ↑ density qtz veining and unconsolidated lithology. = ↑ evidence of brittle structures + hydrothermal fluid (→ [illegible]). Still hollow in weathered bedrock.							
		33.1	34.2												
		34.2	35.0					Solid core (soft) of clay with qtz grains (≤1mm) → 34.1. 34.1 → 34.7 core is fragmented 34.2 → .3 Qtz interval.							
		35.0	36.1					→							
34.9	36.0							Over 1 m of solid qtz. This massive is packed with hematite fill (probably derived from groundwater circulation through adjacent clay). Doesn't contain obvious mineralisation but has few reflective flecks (mica)	87024	35.3	35.6			1.83	190
36.0	36.3							↑ UNCONSOLIDATED material consisting of white/orange clays with a coarser qtz component.							
36.3	40.3							More compact consolidated clay-qtz unit containing irregular veinlets of qtz + a reflective grain ~ mica? (NOT sulphide) also in clay unit.							
		36.1	37.6	1.4				Again the clay/qtz unit has weathered							
		37.6	39.1	1.4				granite appearance, texture + colour.							
[illegible]		39.1	40.6	1.3				to unconsolidated zones b/n 37.5 → .6							

ASSAY VALUES (Analysed by) ANALABS

DRILL RECORD

HOLE NO: MA3

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Au	Sb
								39.0 → .2, 39.4 → .5 These zones dominated by clay & smaller qtz grains. Also get larger qtz fragments, obviously broken vein. In solid core of same lithology get intervals of red (iron rich, [illegible]) stained rock							
40.3	46.8							Fine grained clay PSAMMITE. Core now starting to look relatively fresh. Although iron stained & ~soft (the lithology is a fine grained sst. Still qtz veining 2-4 cm wide b/w 40.3 → .6 & at 40.7 → .8	87025	40.2	40.4			0.742	15
		40.6	42.1												
		42.1	43.6					1 cm qtz vein 45° LCA in the iron stained fine grained, soft (clay) sst at 43.4							
		43.6	45.1					3-4 cm patchy vuggy qtz vein at 43.65. At 44.4 psammite becomes increasingly more fresh – grey, less iron stained → moving out of oxidised weathering zone which is further evidenced by the more solid, harder core							
		45.1	46.6												
46.8	46.9	46.6	48.1					~ CONGLOMERATE type interval. Still may be due to weathering process. Core is clay rich with larger grains of qtz (≤ 3mm) is soft & strongly weathered							
46.9	47.7							Unconsolidated & fragmented. Clay/sand material stained yellow-orange – maybe fault zone [PSAMMITE [illegible] grained]							
47.7								First ~ 1 m is partially oxidised – red/yellow & becomes increasingly fresh down hole							

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DRILL RECORD

HOLE NO: MA3

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES Weathering, Alteration, Fracturing, Veining, Mineralisation	Sample No.	From (m)	To (m)	Recovery m	Recovery %	ASSAY VALUES (Analysed by)
								Qtz veining less intense - occurs at 45.8, 46.9						
								47.8, + 49.1. All at ca 30-50° LCA. Ones						
								in 'fresher' core show internal structures						
								(ie black lines) often perpendicular to						
								the vein wall - these would be fractures						
								with (Fe? fill).						
		48.1	49.6					Fine grained unit (sst) continues. Still has						
		49.6	51.1					irregular areas of diffuse Fe staining - others						
		51.1	52.6					more grey typical of fresh lithology. All						
								core is still relatively soft compared to						
								a fresh psammite seen in other holes indicating						
								either a greater 'mud' component in the						
								original sed-pile OR effect of weathering						
								still -						
								low angle qtz vein (5-15° LCA) 1cm thick						
								at 51.5 has ↑ density of ↑ angle fracturing						
								(network) with black, opaque [illegible] collective fill)						
								Core fragmented b/n 52.4 → .6						
								52.7 → .8						
								Qtz interval (vein?) which is fragmented						
								in this last zone - [illegible]						
								- core has fine reflective flecks						
								disseminated throughout ~ mica(?)						
		52.6	54.1					Fine grained pelitic psammite (cont) into						
		54.1	55.6					[illegible] to be relatively soft indicating						
		55.6	56.6					still effect of surface (?) weathering further						
								evidenced by a yellow (limonitic) staining						
								Qtz veining (evident ~~[illegible]~~ [illegible])						
								53.6 1.2cm + high angle fracturing						
								41NW → 044 from foliation? [illegible]						
								Although vein is oxidised (ie Fe fill fractures)						
								still no evidence for min (pseudomorphs)						

DRILL RECORD

HOLE NO: MA3

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	ASSAY VALUES (Analysed by)
								Qtz veining less intense - occurs at 45.8 46.9 47.8 & 49.1. All at ~ 30-50° LCA. Ones in "fresher" core show internal structures (ie "black lines" often perpendicular to the vein wall - these would be fractures with (Fe) fill).						
		48.1	49.6					Fine grained unit (sst) continues. Still has irregular areas of diffuse Fe staining - others more "grey" typical of fresh lithology. All						
		49.6	51.1					core is still relatively soft compared to a fresh psammite seen in other holes indicating either a greater "mica" component in the original sed. pile OR effect of weathering still.						
		51.1	52.6					Low angle qtz vein (5-15° LCA) 1cm thick at 51.5 has ↑ density of ⊥ angle fracturing (reticulate) with black, brown grey colloidal fill). Core fragmented b/w 52.4 → .6, 52.7 → .8. Qtz interval (vein?) which is fragmented in this last zone - [illegible] - core has fine reflective flecks disseminated throughout ie mica(?)						
		52.6	54.1					Fine grained pelitic psammite (cont) into						
		54.1	55.6					(core is relatively soft indicating						
		55.6	56.6					still effect of surface (?) weathering further evidenced by a yellow (limonitic) staining. Qtz veining (evident, ~~[illegible]~~ at 53.6 — 1.2cm & high angle fracturing 41NW → 044 from foliation? [illegible]. Although vein is oxidised (ie Fe fill fractures) still no evidence for min (pseudomorphs))						

DRILL RECORD

HOLE NO: M13

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES Weathering, Alteration, Fracturing, Veining, Mineralisation	Sample No.	From (m)	To (m)	Recovery m	Recovery %	ASSAY VALUES (Analysed by)
								@ 54.1 → .4 (low angle vein to LCA) 1.3 cm vein — ∨ [illegible] @ 0.8 cm vein Again using foliation S1 developed in marking sandst. unit. ① 59.5 → 310 ① → 082						
								* All veins have qtz fibre/grain growth normal to the vein wall (extension. 55.5 1.5 cm vein ~5-10° LCA 56.8 → .9 2 veins striking sub ll (~15° Δ) but dipping opposite directions Both approx 1cm & planar.						
								Unit has increased in prop of mud, softer more limonitic from ~54.3 Due to [illegible] weathering (surface groundwater) a foliation in the unit is more clearly evident relative to M11/12. Fine dusting - dissemination of white mica (musc) still present in unit.						
		56.6	58.15					Sandy pelite to pelitic psammite (cont). Core is still relatively soft with yellow						
		58.15	58.6					- orange limonitic staining becomes more white						
		58.6	60.1					- grey at ~58.0 ~60.0 - perhaps Kaolin increase which could indicate increase clay content of original lithology. Interval is (brecciated) fragmented b/w 58.0 → 58.6, 60.0 → 60.1						
								Qtz veining still evident, similar relative prop to previous interval [illegible] whilst some veins (58.7, 60.7, 60.8) still ~1cm thick (45° LCA), but a higher prop of thinner (≤ 0.5 cm veinlets). ie b/w 59.8 → .9 veins 25-40° LCA						

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DRILL RECORD

HOLE NO: MA 3

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES Weathering, Alteration, Fracturing, Veining, Mineralisation	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values Au	Sn
								At this ~~point~~ depth narrower vein seen adjacent to thicker (~1cm) Striking //, dipping opposing angles ~30° LCA							
		60.1	61.6					Fe staining of muddy sst continues							
		61.6	63.1					→ ~61.7 (Tray 12) ~~&~~ that become more							
		63.1	64.6					irregular & diffuse. More haematite and limonite indicating less hydration. At ~61.7 → core shows a grey colour, typical of a fresh psammitic (pelitic) unit. It's still slight bleach. Core still ~soft with pelitic component. (Tray 12 probably most solid core interval also). Thicker qtz veins (both 1–2cm) at 60.95, 63.2, 63.4 & 64.7 All planar with no obvious alteration halo in the fresher host rock. Partly vuggy, orientated 30–45° LCA.							
								At 63.2 ... see X cutting relationship 1.4cm vein 45° LCA displaces 0.8cm vein; displacement = 0.6cm REVERSE. Both veins strike approx perpendicular.	87026	63.15	63.2			0.008	–
		64.6	66.1					Grey pelitic psamm to 65.7.							
		66.1	67.6					At 61.15 is a concentration of (M) filled fracture segments which //'s a zone of high strain. Black line segments ~0.4m → 1.0cm ... pll MA1 Not Bark. Slightly (diffuse) Fe stained from 65.7 → end Tray 13. Throughout are zones of relatively strong limonitic staining in the pelitic psammitic unit. These often associated with broken core ~brecciation (?) fragments < 1cm → 4~5cm Probably due to intersecting joints/fractures							

PAGE: 7

(1) Survey 78·1 m

DRILL RECORD

HOLE NO: MA3

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by): Au	Sb
								Fragmented core, b/w 66·5→·6 67·6→7·7							
								Core is white/cream with overprinting							
								Fe oxide staining along fractures b/w 67·5→							
								~69·0. This 'light' colouration (staining)							
								maybe due to larger Kaolin component although							
								lithology is still siliceous							
								B/w 67·6→7·7 is segment of core							
								with high density of obvious "py" lines. All							
								// at ~45° LCA (≤0.10 mm thick) - maybe							
								indicate original So laminations or intense							
								fracture set							
								Qtz veining less prominent. Couple							
								of veins (67·3, 67·4 ~45° LCA 1cm + 5mm thick							
		67·6	69·1					10cm fragmented (Breccia?) zone at 69·3 m							
		69·1	70·6					grey-ish sandy MUD (subtle variations							
		70·6	71·8					in mud/sand) throughout							
								70·3 low angle (5-10° LCA qtz vein, is							
								relatively irregular with Fe staining associated							
								Fractures intersecting vein/host rock) also show							
								limonite staining (·5-1cm ")							
								70·5 (a concentration of short black lines							
								(PY) orientated // - tension fractures + are							
								possibly X cut by V6 vein at 70·3→. Within							
								solid veinlets of py are coarser PY aggregates.							
								The concentration of veinlets forms a "band" which							
								is ~45° LCA.							
								Further low angle qtz veining b/w 70·6							
								→ 70·9 Again no evident alteration							
								but is Fe oxide staining in irregular	87027	71·0	71·16			0·008	15
								patterns about the vein (+ fractures) More							
								PY (tension) fracture fills (concentrated at 72·9							

DRILL RECORD

HOLE NO: MA3

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	ASSAY VALUES (Analysed by)
(cont)		71.8	73.4											
73 →		73.4	75.1											
		75.1	76.6											

Sandy Mud unit is overall a 'light grey' colour indicating partial weathering with irregular Fe oxide bands seen. These associated with fractures in host rock (+ microfractures in veins). Fracture surfaces revealed along broken core show orange yellow (limonitic) staining which is evidence for groundwater circulation post brittle (+ qtz veining). The lithology is 'massive', lacks sed. structures, can be scratched ~ easily compared to fresh psammite (MA1+2) and when scratched ~~[illegible]~~ produces a white-grey kaolin clay type powder

⇒ ~~Psam~~ Psammitic Pelite

Core fragmented b/n 73.7 → .8
74.5 → .55 Both
intervals is some kaolin type coating on the fragments.

71.7 → .75. Narrow, unconsolidated 'puggy' strong iron oxide stained clay – FAULT.

Qtz veining @ 74.9 1cm wide, 45° LCA, fractured with Fe Oxide stain.

76.1 1.8cm vein ~45° LCA. Again fractured with FeO fill. – Fractures are often restricted to veins, only larger (greater magnitude fractures) continue into host rock. ⇒ Post veining deformation more developed in harder more brittle unit (qtz) & plastic deformation in softer sed (clay rich) sed.

76.6 → .7 1cm wide vein at 0–5° LCA does divide → [illegible]

Exposed vein wall shows [illegible] steep / shallow slickensides (FeO stained)

PAGE: 9

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DRILL RECORD

HOLE NO: MA3

LOGGED BY: MKM

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES Weathering, Alteration, Fracturing, Veining, Mineralisation	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by)
77.8	78.7	76.6	77.5					Approximate interval of RELICTIC PSAMMITE.						
		77.5	78.6					Again subtle variation in silica/mud makes						
		78.6	79.6					determination of So difficult in ±60e						
		79.6	81.1					~slightly weathered rox.						
78.7								Psammitic pelite as in last tray, core						
								shows some evidence of weathering, is light						
								grey possibly. Again FeO staining along						
								fractures (unless ground H2O circulated.						
								Core is broken (sharp, planar) at ~50° LCA						
								throughout (~1:20 cm) - possible jointing.						
								Some veining (low propn?)						
								At 79.7 vein affected by weathered						
								("crumbly" + ↑FeO staining) is ~20° LCA +						
								shows possibly high propn of SB. ~~Alt~~ is						
								black, dull, partly reflective on broken surfaces						
								- could be weathered SB. Any Fe sulphides (PY, CPY)						
								would be weathered and into FeO. therefore						
								difficult to distinguish - No obvious pseudomorphs						
								- euhedral cavities etc.						
								80.7 similar vein as at 79.7;						
								Are some fine (low density) 'black'						
								tension lines - PY filled? at 81.0.						
		81.1	82.6					This interval (tray 17) consists entirely						
		82.6	84.1					of slightly weathered (light grey) (silicious)						
		84.1	85.6					pelite. Ultra fine grained / lacks any						
								sedimentary structures → uniform massive.						
								Faint Fe staining b/n 84.3 → .4.						
								- low propn of veining.						
								81.45 1cm vein planar 45° LCA						
								- can see slight greenish alt. halo with PY						
								disseminations. Strikes (sub)// to S1 ~350						
								Assuming S1 dips W, vein also dips west						

DRILL RECORD

HOLE NO: MH 3

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES Weathering, Alteration, Fracturing, Veining, Mineralisation	Sample No.	From (m)	To (m)	Recovery m	Recovery %	ASSAY VALUES (Analysed by)
								Broken vein (SB?) at 85.1						
								85.55 1.5 cm vein planar 45° LCA						
								Fractured with FeO (typical) ~ partly vuggy			1			
								also aggregate (≤2mm) of PY. Have strong(?)						
								FeO (limonite) lining XO [illegible] wall ([illegible])						
								& also outback into fractures adjacent to						
								vein						
								Again probable joints in core						
								(~2 sets, ~sub perpendicular, both 55-75° LCA						
								84.8 . fine PY filled fractures - short						
								segments, low density						
		85.6	87.1											
		87.1	88.6					Relatively fresh (siliceous) plte continuing to						
								88.2 One 10cm zone b/n 87.1 → .2 of						
								Diffuse FeO staining						
								W/ set of ∥ lines (laminations)						
								b/n 86.8 → 87.1						
								Pon66 So(?) ✓						
								71E → 350 10N → 350						
								Veinlet here (~11 to LCA) 67S → 94						
								- may contain SB - black soft opaque						
								material ✓. Fine, irregular veinlets of PY (≤0.5 mm)						
								~~88.2 →~~ b/n 87.2 → .4						
								88.2 → 93.0 Similar lithology but has						
								light bleachings of FeO ~ faint diffuse						
								yellow / orange. Get more intense (deeper orange						
								- yellow about fractures etc (breaks in rock)						
								Some veining b/n 89.2 → .35 2 sub ∥,						
								slightly irregular & is evidence for						
								minor PY min along vein wall.						

DRILL RECORD

HOLE NO: MA3

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES Weathering, Alteration, Fracturing, Veining, Mineralisation	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by)
								Low angle veining at 89.7 (20° LCA), 5 mm wide with PY dep.						
								Here core appear more siliceous						
		88.6	90.1					0.8 cm wide qtz vein 6/n 90.0 → .1. Intersects						
		90.1	91.6					the core on one side → curves down dip.						
		91.6	93.1				P	shows fracturing with black soft mineral fill						
								~91.0m 6 mm qtz vein - surface exposed						
								- coarse grains & unconsolidated, FeO in some						
								fractures in vein						
								92.0 Slight soft clay, unconsol. (small fault?)						
93 →								PELITE From 93.05 → (minor qtz) Core						
								again shows subtle variation b/n mud & qtz						
								From this depth core is white/grey with						
								a dominance of Kaolin (clay). Little or no						
								FeO staining within the interval ~~core~~, is						
								a set of hi (fractures) → these may have						
								represented original So laminations are						
								dense and now appear as grooves						
								with slight orange (light) fill - spectacular						
								effect, PY aggregates disseminated through the						
								interval also / similar to spotted unit in						
								MA1 & 2. If these grooves are original						
								laminations get So / intersection with core						
								face ~ subparallel dip						
								So 5W → 350 79W → 350						
								striking ∥ but dip opposite direction						
								(perpendicular both 45° LCA) is						
								c fracture with sporadic PY aggregate						
								(≤1.5 mm) along length NC						
		93.1	94.6											
		94.6	96.1					This interval (from 90) again has slight						
		96.1	97.5					(faint) FeO staining throughout [illegible]						

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DRILL RECORD

HOLE NO: MA3

LOGGED BY: MKM

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by)
								with fracturing etc						
								94.3 is ~2-3cm wide soft grey clay (pug) zone with dusting of PY on fragment surfaces. From 94.3 → .6 is core of light cream-grey with PY disseminations. This is overprinted (again) by FeO staining - intense adjacent to fractures, becomes diffuse away from the structures						
								94.6 → 98.2 the core of (sandy) clay is a "creamy - light yellow colour (kaolin with faint staining of limonite). Throughout this interval is high density set of // (features) "grooves". Again probably representive original sedimentary laminations (or cleavage?). The grooves are ~~reddish-orange~~ orange-yellow (limonite). In a ~~less~~ relatively fresh section of core b/n 95.7 → 96.1 these grooves are lined with fine grained PY. Difficult to determine through slight weathering. But fine grains are ~reflective + are brassy yellow. Also more nodular PY grains disseminated throughout host rock. Thus in the weathered core intervals, the yellow-orange grooves probably represent oxidised (hydrated) Fe from FeS_2						
								Qtz vein at 95.7 1cm, planar strike ~70° from lamination (So)? strike						
								Irregular qtz vein at 98.1 → 98.25 (end TRO) is highly fractured + stained with FeO						
		97.5	99.1											
		99.1	100.6					98.2 → 99.4. Core of (siliceous) clay is relatively strongly weathered / stained by						
		100.6	101.5					limonite + hematite. Irregular qtz vein ~~...~~						
								~~This is~~ similar to that at 98.1						

(141)

DRILL RECORD

HOLE NO: M13

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	ASSAY VALUES (Analysed by)
								No evident mineralisation, however YO veins						
								are strongly fractured with intense FeO staining						
								in & along these veins						
								Zh 99.0 → 99.1 is .10 cm (→13)						
								qtz (vein) segment is vuggy with coarse						
								qtz grains. As above highly fractured & stained						
								qtz veining continues to ~99.4 Although						
								no evident (Barium PY) min got minor SB in						
								FeO host rock in alteration zones. Also 80						
								PY & SB in fine laminations on Strike						
99.5	99.7							99.5 → 7 unit is grey						
								PELITIC PSAMMITE (micaceous in qtz) The unit is						
								grey & generally fragmented with PY dustings						
99.7	105.35							99 Psammitic PELITE again As in						
								previous tray is cream-white (→ pale yellow)						
								in colour with faint FeO staining						
								Yellow orange // lines (lamination) & spots						
								of orange disseminated in host rock. More						
								evidence for oxidised & hydrated Fe (from PY)						
								100.75 1cm qtz vein at ~70° LCA and						
								striking almost perp. to limonitic laminations						
								Increase in FeO staining at 101.4						
								accompanied with 10 cm zone of unconsolidated						
								limonitic material						
		101.5	102.6					Whole interval (tray 22) comprises limonitic						
		102.6	103.6					(sandy) clay. Although core scratches easily producing						
		103.6	104.35					a white (Kaolin) powder its NOT unconsolidated						
								& stained yellow → orange some zones is						
								cream colour. Core is fragmented (brecciated?)						
								b/n .107 → 102.7 . 104.2 → .35 105.2 → .3						
								Fragments range b/n ~5 mm → 3-4 cm						
								are angular and show a staining (FeO)						

DRILL RECORD

HOLE NO: MA3

LOGGED BY: MKM

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by)
								consistent with that in V6 'solid' core which indicates these fragmented zones were not preferential channelways for fluid (ground H_2O) flow - otherwise show stronger, more intense limonitic (hematitic) staining.						
								Qtz veining						
								103.3 4 cm thick vein 45° LCA, plane parallel with a probable S1 cleavage						
								102.55 2.5 cm vein 15→20° LCA						
								* shows minor PY + SB min						
								→ this vein possibly continues to 103.95. Difficult to determine owing to fragmented zone 'Z way'. To vein ↑ fractured with FeO fill						
								* At 104.8 → 105 core is grey/green with insignificant limonite staining						
								At 104.9 is soft grey clay (gug) zone (2-3cm) with a probable qtz vein (core is broken along this vein producing fragmented qtz). The QTZ vein c-1cm wide consists of 'clean' milky qtz, typical of mineralising qtz. As opposed to all veining recognised in this hole thus far (which ? fractured with ? Fe. This qtz shows NO Fe staining, looks to have some SB + PY min						
								The green-grey colour of host rock ~~rock~~ & smooth texture indicate chlorite/sericite alteration. PY dissemination in this alt. zone.						
105.35		104.35	105.3					Pelitic PSAMMITE, slight increase in silica from last unit						
		105.3	106											
		106.0	10[illegible]											

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DRILL RECORD

HOLE NO: MA3

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by)
		106.6	109.4											
		109.4	111.0											
		111.0	112.6											

From 105.25 → 105.7 is dominantly slight yellow-orange (cream) bleaching/-staining of limonite.

From 105.7 → 107.2 unit is grey no evidence for FeO staining is slight green alt? The zone is [illegible] has physical characteristics of other FeO stained core except for colour. The orig. colouration is uniform throughout the zone. Has fresh look typical of psammite in MA 2 - slight weathering though

* f/h 106.2 → .3 Core is significantly softer with high Kaolin content (introduced) Strong alteration zone ~ Fine PY dissemination throughout this zone. Some fracturing also

From 107.2 → 109.05 core is again cream - yellow - orange, affected by limonite. Stronger colouration about veining.

Qtz veining

108m 3cm. place 45° CA is fractured with FeO fill, partly vuggy & some small (<1mm) cavities ~ possible [illegible] PY.

108.3 2cm vein 60-70° CA, as above features

From 109.05 → core is now grey - no effect of FeO hydration

The unit is fine grained, still scratches relatively easily (relative to psammite in MA (1/2) producing a Kaolin-type clay. This is psammite with high [illegible] content OR clay introduced. Soft character indicates an effect of weathering (ground water) OR alteration

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DRILL RECORD

HOLE NO: MA3

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Au	Sb
								Core is unconsolidated, v. soft, v. clay (pug)							
								b/n 109.4 → .5 (Faulting)							
								And Brecciated (clayed fragments							
								0.4 → 4 cm) b/n 109.5 → 109.9							
								110.8 – .9							
								112.45 → .55 + Fragments due							
								most probably to intersecting fractures rather than							
								1 fault zone as in first (109.45)							
							A	Qtz veining evident in this interval							
								– 109.3 / 8 cm vein, 55° LCA highly fractured as	87028	109.2	109.3			1.70	45
								before however has minor FeO in fractures							
								+ FeO absent adjacent as described. ~ Possible							
								PY + SB min adjacent, host rock is soft, puggy							
								with black (graphite?) clay evident							
								– 109.8 Fragments of milky qtz in							
								soft pug zone (above). Part of X6 vein structure.							
								present (60° CA) minor PY min							
								– 111.6 6 cm vein, similar to others	87029	111.6	111.78			0.083	20
								(i.e. some fracturing + vugs also some yellow							
								clay type fill in some [illegible] PY + (SB)							
								min. fine grains in euhedral aggregates located							
								along vein walls → vein EARLY in paragenesis							
								of vein. – 55-60° LCA							
								– 111.8 1 cm vein, 15° LCA minor PY min							
							* A *	112.7 ~ 3-4 cm vein, fragmented ~ 75° LCA	87030	112.7	112.74			0.091	–
								Milky qtz with a relatively high abn of							
								SB (along vein walls) and PY disseminated							
								+ [illegible]							
								– 112.9 (end of Tray 14) Similar as above							
								– broken qtz – width? 75° LCA with little SB + PY							

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DRILL RECORD

HOLE NO: MA3

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by) Au	Sb
								About these veins and other irregular patterns throughout the original are bleached zones, representing (chlorite) sericite alteration. PY aggregates (≤ 4mm) present in these zones, some PY grains also in "unaltered" host rock. Also get fractures with ↑ PY (+SB) and some minor (< 2mm) qtz veinlets with PY ~ SB.							
		112.6	113.7				↓	This interval (Tray 25) as previous pelitic psammite (as in MAC X2). Has slight overall weathered look ~ light grey & is							
		113.7	115.0					accordingly softer. Bleached halos of sericite (+ chlorite) distinct about veins [illegible] & more diffuse & irregular away from these structures - Again, PY dissemination in alt. zones							
		115.0	115.6					Most significant mineralised veining							
								- 113.9 0.5 cm veinlet 15° LCA, ~ irregular with SB + PY min							
								- 114.6 4 cm vein ~ planar, 80° LCA with SB + PY min (lower prop?)							
								- 114.95 7cm vein with ~SB + PY.	87031	114.95	115.05			0.317	10
								- 115.6 → .8 (long) brown vein 15° LCA (dangle) [illegible] SB + PY min aggregates on vein wall, in host rock (vein surface) ~ some in vein. Veinlet Xcuts: other fractures with minor alteration halo's							
								116 ~ 3cm interval of brecciated milky qtz with minor PY + SB.							
								- 116.2 vein (2mm with ↑ SB, PY)							
								Brecciation 6 in 113.3 → .7 [illegible]							

DRILL RECORD

HOLE NO: MA3

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)
		115.6	116.7					Bleached (sericite (chl)) alteration with
		116.7	117.6					PY dissemination continue to end of tray (+HQ)
		117.6	118.25					Some veinlets with minor PY (+SB) ✓
						NQ		Qtz vein at 118.2→.25 (contact into NQ?)
						↓		3cm thick with minor mineralisation
		118.25	118.7					Start NQ (118.25) This tray (27) is all
		118.7	121.25					pelitic PSAMMITE. For first time is hard
								& obviously siliceous since MA2. Although core
								is almost completely bleached (sericitic alt)
								Fresh areas away from fractures etc. core
								is solid with no significant brecciation.
								High prop^n of qtz veining - but are
								generally narrower than the previous tray.
								- 119.5 X cutting veins
								① 5mm qtz (minor min^n) veinlet is X
								cut by ② a 1-3cm vein striking ‖ but
								dipping opposing opposing directions ~ almost
								perpendicular. ② vein has PY aggregates +
								displaces ① by 0.5cm in a REVERSE
								sense. Thus 2 generation mineralisation with
								shortening during the event
								- B/n 120.3 is set of 3 ‖ veins
								~35° LCA 2 ~ 1cm wide (both mineralised,
								one ? SB + PY min, the third 4mm wide minor
								min, but solid PY line segments adjacent in
								alteration halo ‖ to veinlet.
								B/n 120.7→.9 Further veining. One at 45° LCA
								1cm wide divides clear clip. Minor PY + SB.
								Another at ? angles (~10° LCA) contains high
								prop^n of SB - on broken core surface.
								- 1cm vein at 121.7 planar 50-55° LCA
								with SB (≤1.5mm) concentrated [illegible]

Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by)

DRILL RECORD

HOLE NO: MA3

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Au	Ag
								– 121.8 → 122.6 is 8 cm qtz vein mosaic, some vugs ~55° LCA with only minor min. Below V is a set of // veinlets ≤ 2mm wide which show sporadic PY aggregates. Further veining 6/m. 123.1 → .45 a V // set at V 55–70° LCA, appear barren	87032	121.8	122.0			0433	6
									87033	123.1	123.35			0733	10
								(Some minor veinlets (+ associated alteration halos to end of tray 27							
								Now appear to be at end of mineralised intersection – MISSING LINK? Most prominent in prev. tray(s).							
		121.75	124.8					Irregular diffuse alteration in (politic) psammite continues to ~ 125.8. Mostly along/about fractures / veinlets although 16/m 125.15 → .4 is solid yellow green intense bleaching, not associated with any particular bottle structure							
		124.8	127.85					From 125.18 "Psammite" core as in MA1 + 2. Fresh + hard with alteration restricted to distinct halos about fractures / veinlets (+ veins). Appears a prominent set of fractures / veinlets ~45° LCA. Veinlets (≤ 2mm wide) of qtz – vuggy (with FeO also (limonite)) ~ have a little alt. halo							
								-128.65 Vein (7mm) ~20° LCA of qtz and has ? prop of PY + SB							
								130.2 → .3 (end T28) 2 veins							
								(1) 1 → 1.5 cm thick irregular planar clip 15-20° LCA has SB + PY min. This is Xcut a 1.5 cm vein ~80° LCA with PY min → 1 [illegible]							

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DRILL RECORD

HOLE NO: MA3

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log
		127.85	130.9				
		130.9	133.85				

CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)

One early SB + PY min. 2nd generation (due change in stress field (? angle veins) = PY min. Again PY aggregate disseminated through alteration zone. Strong bleaching adjacent (1-2cm).

Vein seen at end of previous tray continues into this tray (24) with associated bleaching 4-5 cm away from vein with PY dissemination.

Fresh pelitic PSAMMITE to 133.0

Is a brecciated milky mimic barren (?) vein at 131.

From 133 → 134.1 core is strongly bleached. Brecciated b/w ① 132.9 → 133, 133.4 → 133.5. This zone has finer fragments (≤ 2cm) coated with kaolin + pelitic component.

133.4 is 1cm wide vein ~35° CCA with high prop. of PY aggregates + SB. Is vuggy with bulk of min. dep. in cavities.

133.9 6cm wide irregular vein also with significant PY (SB) min.

From 134 → 134.2 is zone of qtz veining ① 1cm wide 20° CCA with high SB dep. (collection bladed mineral - euhedral). Also PY (CPY?) is irregular + qtz vein has ~ type of layering effect // to vein wall indicating multiple qtz generations.

② Appears to intersect another vein - brecciated - difficult to determine also with high SB + PY. Strong alteration about these veins - SIGNIFICANT intersection? - part of Missing Link structure (footwall?)

Sample No.	From (m)	To (m)	Recovery m	Recovery %	Au	Sb
87034	134.1	134.2			0.167	9

DRILL RECORD

HOLE NO: MA3

LOGGED BY: MKM

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES Weathering, Alteration, Fracturing, Veining, Mineralisation	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by)
		133.95	137											
		137	140.05											

From 134.1 → 1000 becoming fresh with alteration halos about few fractures & veinlets distinct in the fresh host proximity.

[⇒ less prop^n of fractures (fluid channelways) ⇒ less alteration.]

Fresh (pelitic) PSAMMITE continues into tray 30. – go for whole interval.

Are some possibly faint (bleached) laminations 6/m – 137.1 → 138.5

– 140.1 → .3

So 1) 80E → 350 2) ~20W → 350

Veining using 1)

A 1) 50 20W → 340. 5mm wide

using 2) 80W → 340

(perhaps 2) more probable ⇒ So(?) is 20W (2)).

This vein has ~M & SB min & Xcuts a vein which is ‖ to the LCA & can therefore be traced for ~2 m in the core

B – ‖ vein vertical → 55°. 4mm wide

~min?

B X cuts another vein C (⇒ A, B, C (3) diff generations)

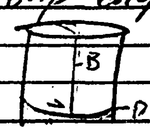
C using 1) above 78W → 320

A 4th veinlet (D) X cuts C & displaces B

(⇒ similar generation as A?)

D (using 1) above) 48E → 160

– apparent strike-slip displacement of B (1cm)



136

DRILL RECORD

HOLE NO: MM3

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	Recovery m	Recovery %	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by)
								Is bleached (alteration) zone 4cm wide						
								associated with the // vein at 140.1						
								At 140.2 is vein subparallel to So(?)						
								(~40° cA) which displaces // vein in a						
								REVERSE sense (apparent) sense 0.5 cm						
								~~[illegible]~~ same generation as 'D' before						
								Other (minor) fracture - veinlets → end						
								of interval						
								* Is minimal alteration associated with any						
								vein generation						
142.9	148.75	140.05	143.1					Coarse grained PSAMMITIC UNIT with white,						
		143.1	145.95					opaque grains (≤4mm - euhedral(?)) - granitic						
								type texture ~ probably a moderately sorted						
								conglomerate (?) - Qtz rich ~ uniform grain size (1-2mm)						
								Is So relationship b/w fine grained						
								(fresh) psammite & this coarse unit at 142.9						
								So 80W → 350						
								28W → 350						
								Irregular qtz veining at 142.7 & Py min						
								- alteration ~~[illegible]~~ halo						
								The interval is irregularly bleached zones						
								- not distinct - diffuse.						
								* Is Py grains / aggregate (≤1mm) disseminated						
								throughout the unit - appears secondary NOT						
								sedimentary - introduced through alteration fluids						
								/ Minor qtz veining through the interval						
		145.95	149.1											
148.75	153.2	149.1	152.25					FINE Grained (fresh) PSAMMITE. Is some coarser grains						
								but generally ∴ fine						
								* Qtz veining b/w 149.4 → .45 2 Qtz veins						
								@ 45° cA (8) mm wide, ↑ alteration, tr Py aggs						
								≈ 70° cA less Barren with						

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DRILL RECORD

HOLE NO: MA3

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	ASSAY VALUES (Analysed by)
								~150·1m qtz veining Xcutting + offset						
						*		1 3cm vein (PY assoc 1+ minor SB ~50° LCA						
								Xcuts + displaced ~1cm REVERSE by						
								qtz (+PY) veinlet ~30° LCA						
								⇒ Shortening of crust during min[eralising] event						
								152.7 3cm wide zone – Fault, consolidated brecciated hard rock with qtz vein – brecciated – CATACLASTIC zone. Faulting → Qtz vein → faulting – healed breccia. Qtz has SB min + PY vein at 45° LCA with solid PY veinlets (tension) perpendicular to the cataclastic zone. Large 10–20 cm alteration zone adjacent to the cataclastic zone						
153·2	153·4							Coarse grained Psammite as before. 2mm qtz veinlet 0–5° LCA with alteration						
153·4	159·2							Fine grained PSAMMITE. B/n 153·3 → ·5 is zone of alteration + moricky mineralised qtz vein(lets) – Dominantly 2 striking subparallel dipping opposing angles. Only one has PY + SB min (fine grained) along walls. Both veins X cut by a (4mm) veinlet of qtz (vuggy) with relatively high PY. (→ 2 generations min) Also in this interval b/w 153·4 → 155 are fractures + veinlets with alteration halo						
		153·75	155·2					B/n ~154·8 → 155·75 is 0–5° LCA qtz + PY + SB ✓						
		155·2	156·35					vein 7mm wide can be traced planar with minimal alteration in the fresh psammite host.						

DRILL RECORD

HOLE NO: MA3

LOGGED BY: MKM

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by)
								Foliation (S₁?) developed in the ~~clear~~ psammite						
								(~350) is perpendicular to the vein						
								⇒ striking ~080°.						
								Minor veining b/n 156.3 → .5 3						
								veins 70° — 40° LCA one with PY agg. all have						
								alteration halos Host is (slightly) coarser grained						
								here | * ln Fine gr						
								Minor fracturing with alteration halos to						
								end of fine grained unit						
								158.6 Qtz vein 1.5cm wide, considerably						
								PY dep, 45° LCA On exposed vein wall surface						
								is slickenside growth (in PY) which indicates						
								strike slip movement POST mineralisation						
157.2	161.9	155.5						Coarse grained unit PSAMMITIC						
								Minor veining + fracturing						
								- Tonib6 pelitic laminations 160 - 160.2						
								150 75° → 350 ~30° → 350						
								- 60% PY grains (large grains) disseminated						
								through the coarse unit also						
		158.35	161.4				?	B/n 161.5 → .8 is (strong) yellow bleached						
		161.4	161.95					zone + associated fractures.						
161.9	166.2							FINE Grained PSAMMITE - 162 vein 7mm wide						
								~45° LCA with very relatively high prop^n of						
								SB + alteration halo						
								165.4 1cm of vein with ≤ 2mm PY grains						
								+ probable "shiny like segments" of SB ∥ to vein						
								wall (black line) ± alteration halo						
166.2	169.6							COARSE grained PSAMMITE. Becomes increasingly						
								bleached (towards end of Fu 34).						
								Qtz veins b/n 167.5 (-7.5?)						
								3 - 11 (ext) Range 2.5 cm → 5cm → ~10cm						
								- minor min BUT again see PY in host.						

DRILL RECORD

HOLE NO: M43

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by) Au	Sb
186								From 186.0 → 190.3 core is uniformly bleached 'cream' type colour. Is also softer with greater / clay (Kaolin) content – reflecting change in original sed. comp or introduction of clay minerals into [illegible] largely psammitic host rock through alteration fluids.							
								From 186.0 → 187.3, core is solid, some fractures. A cleavage (S1?) is well developed in the core (recognised on broken surfaces) due to higher clay content ~ muscovite growth (? fine). // to cleavage are fine laminations < 0.5mm, possibly PY.							
								187.3 → 187.9 Core is brecciated into fragments ≤ 5cm. Dominantly unconsolidated – shear / fault zone. High Kaolin component in unconsolidated material.	87037	187.3	187.9			0.017	30
								187.9 → 188.85 ~ solid core ~ although fractured – not brecciated. (as above comp.)							
								188.5 Qtz vein 30° LCA 4mm wide, irregular in morphology with perpendicular to wall qtz fibre growth – extensional – barren.							
								188.85 → ~190.3 Core brecciated NOT as intense as above interval, fragments 1cm → 5cm. No unconsolidated material. Fragmentation largely due to intersecting fractures & veins.							
								Few qtz (3-4) veins recognised in this fragmented pelitic psammite ≤ 8mm & contain PY & SB min. NOT prominent. PY dissemination (± SB) in host rock (alteration ass.)							
		188.65	191.65					From 190.3 → 194.? core (pelitic) psammite becomes fresh although still has faint bleaching. Also							
		191.65	194.65					appear 'light' coloured laminations ~ S0 (pelitic comp.)							

DRILL RECORD

HOLE NO: MA3

LOGGED BY: MKM

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	RECOVERY m	RECOVERY %	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES Au		Sb				
								S0 ?? 80ᵘ → 350 , 20ᵘ → 350												
								At 193.1 is a qtz vein 75° LCA 6mm wide with minor SB (py?) min. Has a strong cleavage developed in it which ~~[illegible]~~ is parallel to the laminations used for S0 - This cleavage ⇒ laminations a deformation? (not S0?)												
								The vein strikes perpendicular to the cleavage												
								193.2 7mm qtz vein with higher prop of SB + py. Is ∥ with previous vein dips opposing direction (≈40°). Also has cleavage (or frequency fractures?) through it												
								194.1 → "Fresher" psammite no pelitic laminations?? - typically (fresh) fine grained psammite												
								Minor fracturing & alt. halos - Couple low angle 5-15° LCA fractures. 4cm qtz vein at ~~194~~ 195.1, 70° LCA with a single py aggregate ~1cm irregular												
		194.64	197.65																	
		197.65	200.35					Fresh psam (fine grained) contains [illegible] few 40 Are some ~~are~~ some 'light' diffuse irregular alt. Alteration most prominent about fractures (halo's) Some fracture surfaces reveal fine clustings of py.												
								B/L 199.2 → 199.6 is a relatively strong alteration (bleached zone) has fracture ~~[illegible]~~	87038	195.11	195.17			0.032		3				
									87039	195.8	195.85			0.093		—				
								hosted py, fine black ~~[illegible]~~ veinlets with sporadic py clots & py grains (aggregates) disseminated throughout the alteration												
								Single qtz vein at 199.5, 1cm, 45° LCA minor py.												

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DRILL RECORD

HOLE NO: Md 3

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	ASSAY VALUES (Analysed by)
								Bleaching also from 200m → 202.8						
								b/n 200.1 → .2 qtz veining.						
								2 veins 1.3cm wide each, strike ∥						
								but dip opposing angle (~90° diff)						
								One displaces other ~1cm appears						
								"Normal" sense						
		200.35	203.65					Qtz veining b/n ~~200~~ 202.2 → .4; 2, 1 → 1.4cm						
		203.65	206.35					∥ (barren?) 25–35° CCA. In host rock (along						
								vein ~~[illegible]~~ wall) are scattered ≤2mm PY (ASP?) JR						
								dissemination euhedral. This vein "joins" another						
								striking ∥ dipping opposite ~90°. Is vuggy						
								with coarse (up to 7mm) qtz [illegible] growth						
								into cavities. Some minor PY · SB min. Again						
								so coarse 2mm-4mm euhedral PY grains in						
								host rock. This vein partly broken is approx						
								4-5 cm.						
								From 202.8 core becomes fresher with						
								alteration being restricted to narrow, irregular						
								halos about fractures & veinlets (rather than						
								consistent bleach through psammite						
								Some low angle 0-5° CCA fracturing						
								+ veinlets vary b/n 30 → 85° CCA.						
								Solid bleaching of core b/n 204 – 205.3						
								– Vein at 205.0 1.2cm ~30° CCA shows PY (CPY?)						
								min. [illegible] aggregates ≤2mm ± SB						
								Further bleaching b/n 205.6 →						
								within this zone 205.7 → 206.4 is lighter						
205.7	206.4							laminations and darker in a consistent bleached						
								rock → PSAMMITIC PELITE. Although core is						
								bleached + soft typical of an altered						
								rock, laminations do indicate a more PELITIC compo-						

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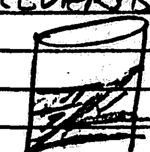
DRILL RECORD

HOLE NO: MA3

LOGGED BY: MKM

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	m	%	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES Weathering, Alteration, Fracturing, Veining, Mineralisation	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by)
204								→ So 85W → 350 ∠30W → 350						
								Fine grained (pelitic) PSAMMITE still bleached from above →						
								B/n 207.55 → .45 is interval of broken qtz - obvious vein → 55° CCA contains ↑ minor py + SPS. At 207.45 is solid core for 5 cm which is cataclasite with narrow 4 band lens of brecciated qtz in a clay (sulphide?) groundmass. Qtz vein also fractured with fill of probable sulphide.						
								Beneath +6 qtz (the 4cm) - cataclastic zone host rock has ↑ density of fractures - with fine (≤1mm) py fill						
								This is an obvious fault (brittle) zone						
206.55	209.55							Bleached psammite → 208.6. Fresh psammite +6m to 213.6. Alteration haloes present about fractures + veinlets						
209.55	212.55							Couple ∥ veinlets of qtz at 209.9 + .9 2mm + qtz contains ↑ propⁿ of CPY (brassy yellow) or PY ~45° LCA						
								B/n 213.6 → .9 Bleached zone of psamm containing ↑ density of irregular veinlets of chert type material. One of these fracture fills displaces a 8mm qtz vein (barren). Both strike ∥ but fracture at dipping more steeply! DISPLACEMENT = 2cm REVERSE						
								 - set of irregular fracture zone fill aligned at ↑ angle to "main" fractures - tension stress developed						

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DRILL RECORD

HOLE NO: MA3

LOGGED BY: MKM

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	RECOVERY m	RECOVERY %	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by)
		212.65	215.65					Fresh fine (minor intervals of coarser psamm)						
		215.65	218.65					grained psammite from 213.9 →						
								12 cm strong bleached zone						
								b/n 211.55 → .67						
								- Interval (Tray 43) has						
								minor fractures & veins with alteration						
								halos						
								At 217.95 is 4mm qtz vein at ~85° CA						
								with relatively high prop? of PY ± SB + ~CO3						
								(white general) This vein Xcuts an						
								irregular qtz (CO3? PY veinlet at 5-20° CA.						
								SB PY → SB + PY in paragen.						
								Fractures dominantly 2 sets. BOTH						
								strike ∥, dip opposing direction ~90° b/n						
								both						
		218.65	221.65					Fresh fine grained psamm all tray 44. There is						
		221.65	224.65					a ~high prop of fractures, veinlets (≤ 2mm)						
								& a few thicker (5-7mm minor later qtz veins) All						
								structures have distinct alteration halos						
								B/n 221.75 → 222.1 is more consistent alt						
								zone, appears associated with a set of q/y						
								veinlets) minor fault (PY)						
								Cross-cutting relationships show at least 2						
								fracture-veinlet generations Although show						
								varying angles (orientation), general set at ~45° CA						
		224.65	227.65					As above, all tray 45 is fine grained fresh						
		230.65						PSAMMITE Again are fractures, ~veinlets &						
		227.65	230.65					fewer qtz veins than above.						
								Is a 5cm qtz vein at 229.25						
								with some PY min - partly vuggy - minimal						
								alteration						
								* Throughout the psamm are varying disseminations of PY (fine)						

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DRILL RECORD

HOLE NO: MA3

LOGGED BY: MKM

Depth From (m)	Depth To (m)	Recovery From (m)	Recovery To (m)	m	%	Core Size	Graphic Log	Core Description / Special Features (Weathering, Alteration, Fracturing, Veining, Mineralisation)	Sample No.	From (m)	To (m)	Recovery m	Recovery %	Assay Values (Analysed by)
		23065	23365					All interval (T 46) as above, fine grained, FRESH						
		23365	23665					PSAMMITE, less fractures & veinlets noc.						
								234.1 – 1cm vein with ~PY min. planar, 45° CA						
								+ alteration						
								~235.95 Couple veinlets qtz CO3 PY, 2-3mm						
								① ~15° LCA						
								② 45° Xcut?						
		23665	23965					All interval fresh psammite, becomes slightly						
		23965	24265					coarser grained at 239.6 → 242.4						
								Small zone of bleaching & PY dissemination						
								b/w 239.5 → .7 Dominantly associated with						
								qtz SB (PY) vein, 5mm 30° CA.						
								Set of 3 qtz (CO3?) PY veinlets (2mm) b/w 243.8 → .9						
								45° CA with 2 cm alt. halo's						
								Other minor fracturing & alt halo's						
								veinlets in this (tray 47) interval						
								* Dominant Psamm, may be drilling down dip (mainly)						
		24265	24565					Again whole interval (tray 48) is fine						
		24565	24865					grained fresh PSAMMITE, minor fracturing						
		24865	25165					Some veinlets (<1.5mm) b/w 250 → 250.4						
								qtz (PY) + alteration halos. PY dissem in alt						
								zone – not fine PY in unaltered host rock,						
								also propn varies. Also in PSAMM got						
				P on psamm				black reflective grains – common in all psamm						
		25165	25465					Fine grain Fresh Psammite whole interval slight						
		25465	25765					increase in pelitic component b/w ~252.4 → .7						
								This interval more fresh than previous trays						
								– of fractures etc of alt. halo's. 2 1.5 cm veins						

DRILL RECORD

HOLE NO:

LOGGED BY:

DEPTH From (m)	DEPTH To (m)	RECOVERY From (m)	RECOVERY To (m)	RECOVERY m	RECOVERY %	Core Size	Graphic Log	CORE DESCRIPTION / SPECIAL FEATURES Weathering, Alteration, Fracturing, Veining, Mineralisation	Sample No.	From (m)	To (m)	RECOVERY m	RECOVERY %	ASSAY VALUES (Analysed by)
								1) 255.0 planar 70-75° CA ~barren PY + low sericitic ± alteration -						
								2) 256.3 planar 75(-80)° CA PY + NO alteration ± equilibration with host rock.						
		256.5	260.65					fresh fine grained psammite to 260.65						
								(~ slightly pelitic [graphitic?] interval 6m 257.4 → 258.2 ? drill shudder) END MA3						

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