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PLACECO AUSTRALIA PTY LTD

Incorporated in Tasmania

11 Midland Highway
Brighton TAS 7030 AUSTRALIA
Ph: 61-02-681222
Fax: 61-02-681349
Tlx: AA 33427

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EXPLORATION LICENCE 35/86 - BURNS CREEK

ANNUAL REPORT : YEAR 1

(25 August 1987 -- 24 August 1988)

K.C. MORRISON

V. HOFTO

August 1988

88-2846

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TENEMENT INFORMATION

EL 35/86 is a 55km^2 tenement in the Burns Creek area, NE Tasmania (Figure 1, Appendix 1). The licence was granted on 28 August 1987, for a licence year covering the period 25 August 1987 to 24 August 1988.

The licence is owned 100% by Placeco Australia Pty. Ltd. On 6 January 1987, Placeco entered an agreement with Bass Strait Oil & Gas (Holdings) N.L. whereby Bass acquired from Placeco a first right of refusal to enter into a joint venture to explore EL 35/86. On 7 September 1987, this option was exercised. Bass can earn a 20% interest in the licence by expending $50,000 on exploration prior to 24 August 1988, and can earn an additional 30% interest by expending an additional $150,000 on exploration within the licence area before 24 August 1990.

EXPLORATION PHILOSOPHY & OBJECTIVES

The aim is to study in some detail the geological controls on mineralisation at the only known gold occurrence within the EL, and use that data base to explore for replica deposits.

SUMMARY OF WORK COMPLETED IN YEAR 1
(25 August, 1987 - 24 August, 1988)

Composite rock chip samples were taken from various locations on, and adjacent to, the old hard rock workings at Golden Hill to determine grade and investigate whether or not the country rock was mineralised. Some structural trends in the old hard rock workings were also recorded in an attempt to define a relationship between the mineralised vein and major structural linears.

A study of fluid inclusions in samples from NE Tasmania was carried out in an attempt to differentiate between a magmatic and metamorphic source for the fluid depositing vein quartz in sites apparently removed from granite contacts and hosted in the Mathinna Beds (Appendix 3).

SPECIFIC SURVEYS

Rock-chip Sampling Programme - Golden Hill Mine Area

On October 22-23 1987, composite rock chip samples were taken from various locations on and adjacent to the old hard rock workings at Golden Hill Mine (Figure 2). Some structural trends in the host rocks were also recorded. The rocks were assayed for arsenic and gold (Appendix 2).

The ore body was (most of it appears to have been mined) an E-W trending vein or lens of quartz hosted in Mathinna Group meta-sedimentary rocks. The eastern edge of the body is exposed in the main adit.

A recent logging road which cuts across the trend of the vein, some 230 metres west of its eastern origin, exposes continuous outcrop of the host rocks and the vein is not intersected. The

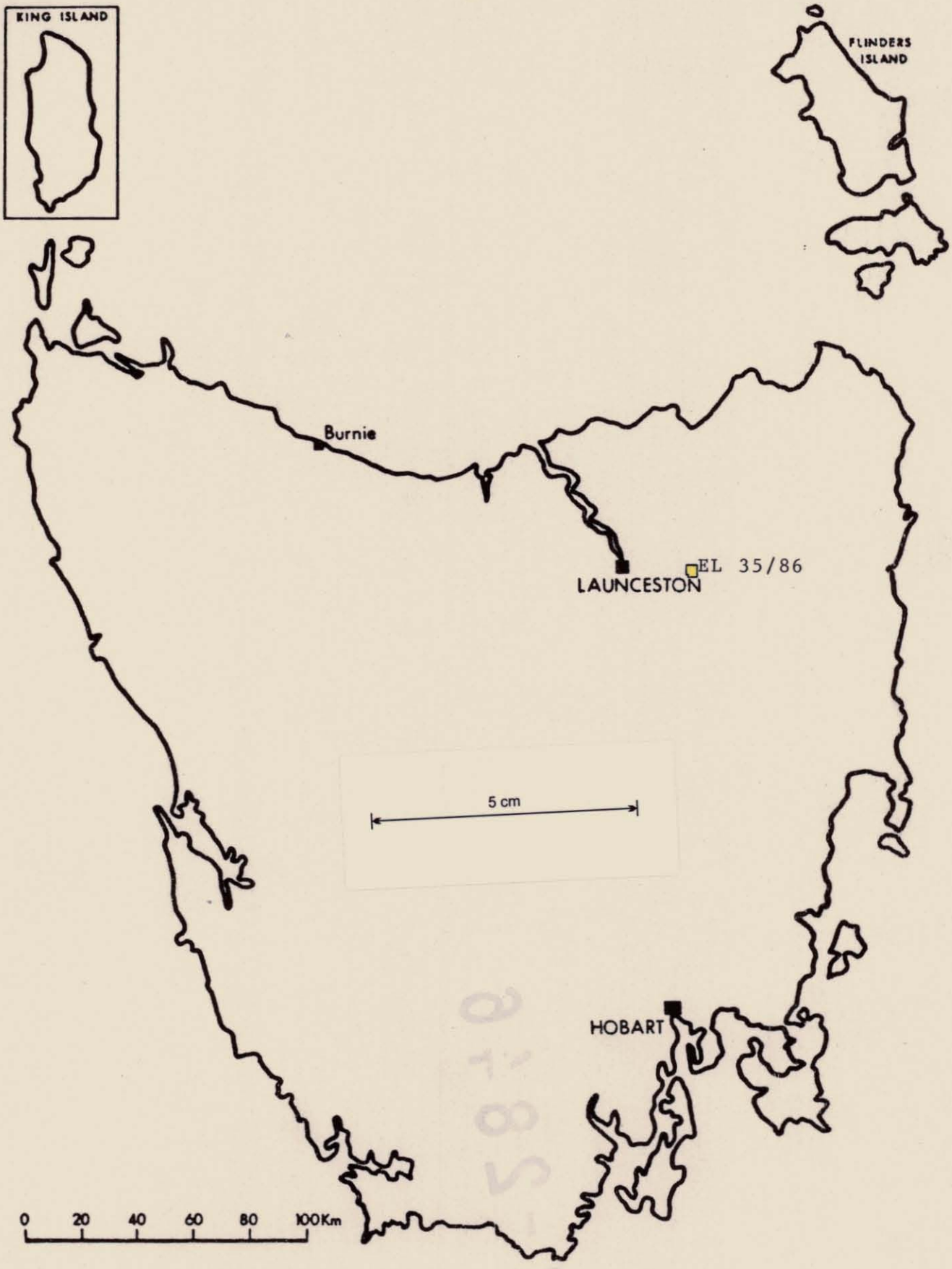

Figure 1. Location Map - EL 35/86

western extremity of workings which show vein quartz in their dumps is approximately 120 metres along strike from the eastern origin. Unless the vein plunges towards the west, its strike length is approximately 120 metres. Inside the adit, vein width varies from zero to about 40 cm. In the vertical direction it is lenticluar in shape and if this lenticularity is maintained with depth, the veins could be expected to pinch out 50 metres below the surface.

No sulphide or other direct evidence of mineralisation was observed in the samples, however the vein quartz typically shows evidence of oxidation alteration, characteristic of quartz carrying free gold in the Mathinna Group gold province.

STRUCTURAL GEOLOGY

Three sets of linears are interpreted from 1:15,000 black and white air photos (Figure 3.). They trend NNE-SSW, NE-SW and ENE-WSW. The latter trend is represented by a single strike ridge through the hill on which the mine is located. In detail there is no definite relationship between the mineralised vein and the main interpreted linears, but the eastern origin of the ore body may occur at the intersection of the ENE-WSW strike ridge and the NNE-SSW linear just east of the adit.

Dip and strike of joint faces was recorded on several outcrops near the adit entrances and in cuttings beside the Burns Creek Road. These are insufficient readings to make any conclusions but the density of well preserved outcrop indicates that a useful structural map could be produced.

ASSAY RESULTS

All 36 samples were assayed by ANALABS, Burnie for arsenic (vapour generation/AAS) and gold (fire assay fusion/AAS).

Arsenic values ranged from 8ppm (BC17) to 1000ppm (BC3). Gold varied from <0.008ppm (several samples) to a maximum of 32.8ppm (BC25, check assay). 14 samples gave gold values >1ppm (Appendix 2).

The arsenic values are generally low for mineralised quartz veins in the Mathinna Group province, and this is consistent with the absence of visible sulphide and the fact that only rocks left by the early miners were sampled, the gold grades are suprisingly rich, suggesting mainly free gold. This interpretation is supported by the relatively low values of 4-5ppm obtained in the tailings sands (BC7, BC8).

Arsenic appears to be a useful geochemical indicator. Samples BC19 - BC23 and BC24 - BC30, which essentially traverse normal to the trend of the ore body, show a systematic arsenic trend from detection level at BC19 to a maximum of 170ppm (BC23) and back to 150ppm (BC30). A strike extension of the ore body at the surface would have been sampled by BC22 and/or BC23. The ore body is clearly not exposed in the logging road and as BC22 and BC23 were sampled upslope from all mine workings there could be no contamination from the peak values on that part of the traverse. The most likely explanations are that either the ore body plunges

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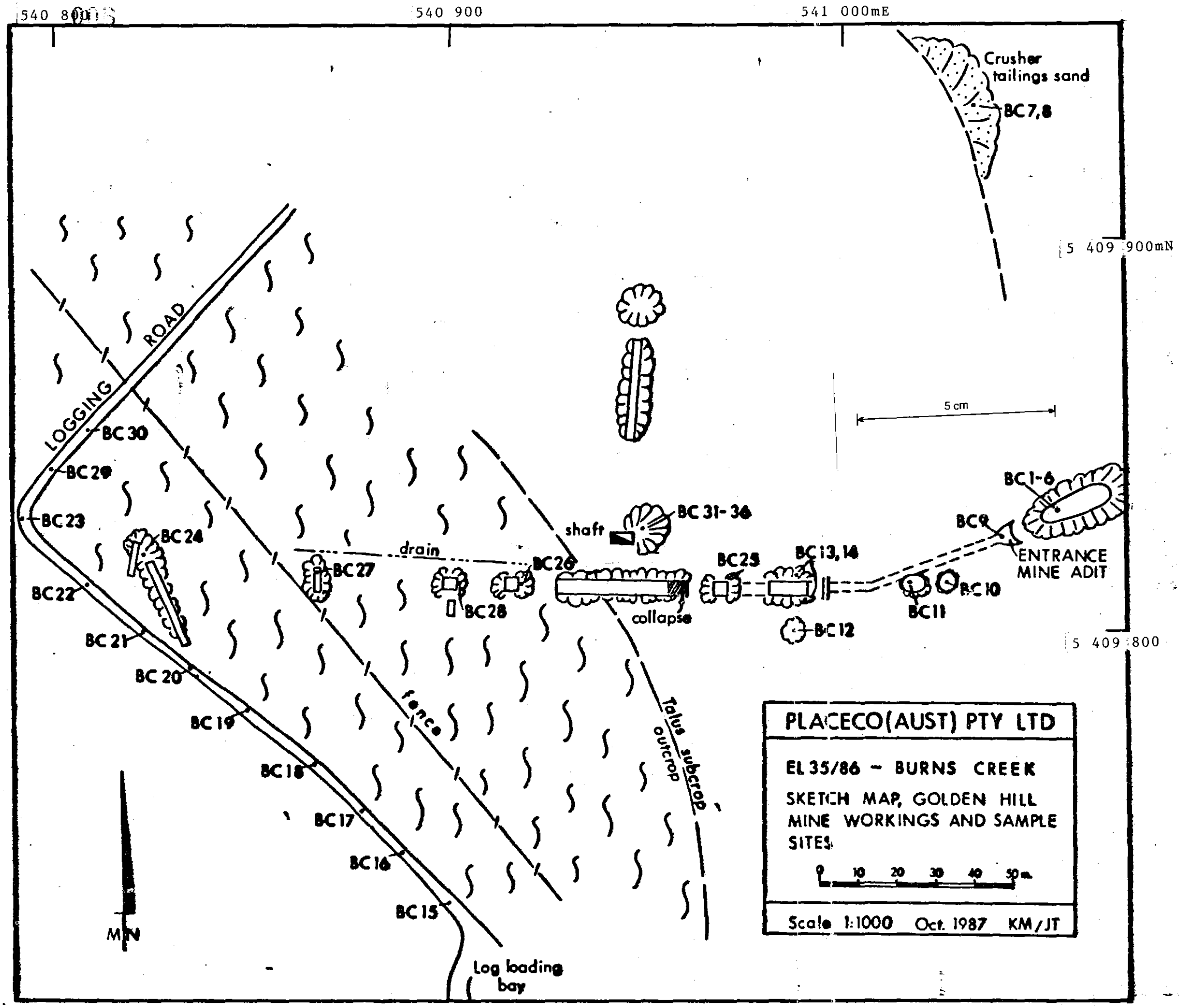

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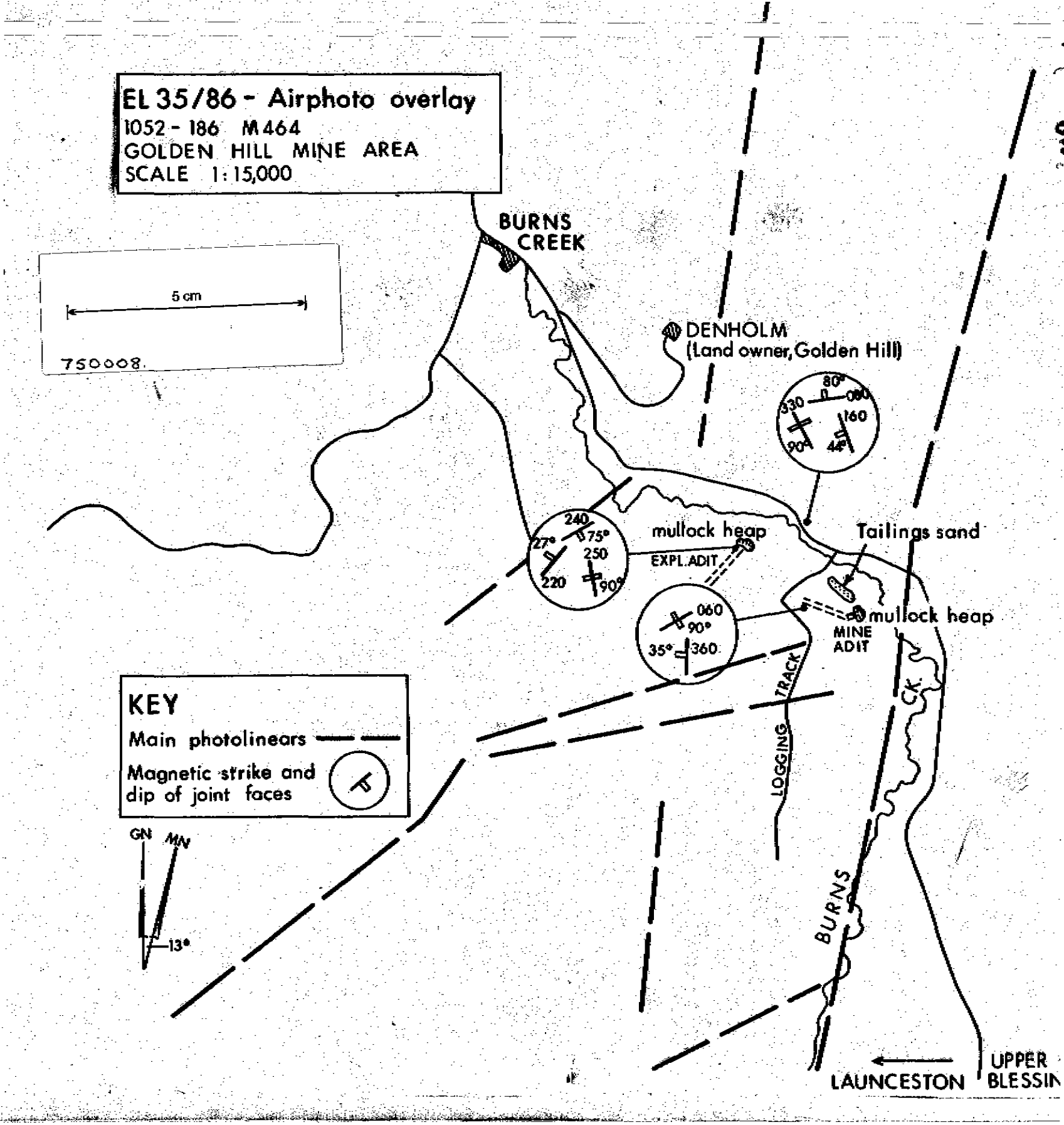
EL 35/86 - Airphoto overlay
1052 - 186 M464
GOLDEN HILL MINE AREA
SCALE 1:15,000
5 cm
750008.
BURNS CREEK
DENHOLM
(Land owner, Golden Hill)
80°
330
090
160
90°
44°
240
27°
75°
250
220
90°
mullock heap
EXPL. ADIT
Tailings sand
060
90°
35°
360
mullock heap
MINE ADIT
LOGGING TRACK
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BURNS
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Main photolinears
Magnetic strike and dip of joint faces
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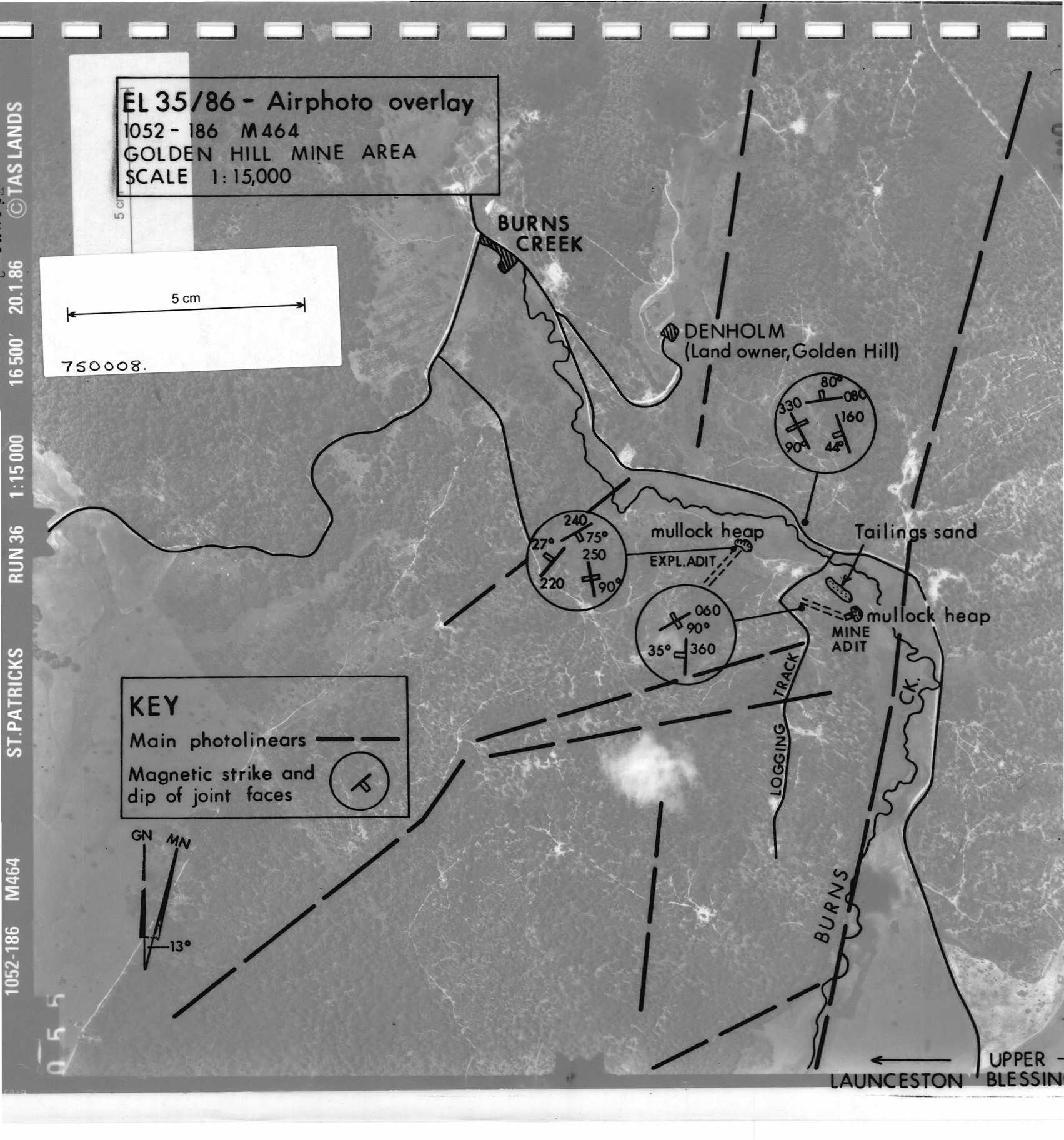
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GOLDEN HILL MINE AREA
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UPPER
BLESSIN
1052-186 M464 ST.PATRICKS RUN 36 1:15 000 16 500' 20.1.86 ©TAS LANDS

to the west and vertical arsenic leakage has produced the observed anomaly, or that lateral dispersion from the known ore body has produced an arsenic halo in the host rock.

Gold values show a strong positive correlation with the presence of vein quartz and a strong negative correlation with quartz-free Mathinna Group slates and sandstones adjacent to the vein. The only possible exception is BC28 (1 ppm) where no vein quartz was observed in the rock chips sampled.

Study on Fluid Inclusions From NE Tasmanian Samples

A fluid inclusion study was undertaken on three NE Tasmanian samples (Appendix 3) :

1. Trafalgar Granodiorite + quartz + carbonate
2. Burns Creek Mathinna Group + quartz
3. Portland vein quartz.

The fluid and isotopic characteristics of Au-rich samples containing galena and arsenopyrite suggest a dominantly magmatic origin for the ore fluid.

The compelling magmatic features of the fluids are their moderate to high temperatures, and moderate salinities (whereas metamorphic fluids are generally low in salinity), and their low CH_4 content (whereas a metamorphic fluid derived from the pyrophyllite-grade carbonaceous Mathinna Beds should contain appreciable CH_4). The carbon and oxygen isotope values are also convincingly magmatic, particularly compared to values from true "slate belt" vein provinces. Note however that if metamorphic fluids had reacted with a metamorphic basement of mafic igneous rock then they could inherit a magmatic signature as is thought for the Ballarat - Bendigo deposits. The fact that pre-Mathinna Group basement has been digested or otherwise removed also allows a metamorphic origin to still be considered.

CONCLUSIONS & RECOMMENDATIONS

The sampling to date at Golden Hill indicates that mineralisation was restricted to the quartz vein and that the grade was significantly high within the vein. Given that the quartz-rich material left by the miners carries between 1 and 30g/t Au, and that approximately 5g/t Au remains in the mill tailings, it is likely that the ore carried)15g/t.

With the possible exception of BC 28, there is no evidence of significant gold mineralisation in the host meta-sediments, even immediately adjacent to the quartz vein.

The conclusions above mean that the concept of extensive lower grade mineralisation in a halo around richly mineralised veins is not supported at Golden Hill. Individual quartz veins of the type mined at Golden Hill may represent viable targets for underground mining if the tonnage in such veins is large enough to pay back the cost of establishing the mine and plant. The following exercise is an example of how the minimum vein size required for viability could be assessed.

010

If $5,000,000 worth of gold to be produced in 2 years is deemed the minumum revenue to sustain a small hard rock operation, then:-

Recoverable gold = 250,000 grammes (assume gold price of $20/gm).

- assume average recoverable grade of 10g/tonne, then:-

  Tonnage ore mined in 2 years = 25,000t.

- assume 50% of the vein can be recovered by efficient mining, then :-

  vein mass = 50,000t
  = 20,000m^3 (S.G. = 2.5)

- assume average vein width = 1 metre and maximum depth to be mined = 50 metres, then :-

  xm x 50m x 1m = 20,000m^3
  x = 400 metres = vein strike length

PROPOSED FUTURE EXPLORATION

Detailed structural mapping of the Golden Hill mine area will be carried out in Year 2 to develop a structural model to show the pattern of shears and tension gashes which would result from all possible deformation scenarios compatible with the field evidence. This would generate conceptual quartz vein targets which can be tested geophysically and by drilling.

8258

LEGEND

5 cm

SCALE 1:25 000
1 millimetre represents 25 metres

Caravan park; Camping ground
Rubbish disposal area; Cemetery
Trigonometric station; Spot elevation
Contour with value; Depression contour
Quarry or open cut mine
Broken rocky surface
Dense forest; Medium forest
Low dense vegetation; Distinctive grass
Orchard; Pine plantation

Windbreak
Swamp; Land subject to flooding
Waterfall; Rapids
Indefinite shoreline or floodbank; Levee
Tidal rocks or ledge; Offshore rock
Lighthouse; Exposed wreck
Sand; Tidal reef
Saline coastal flat; Tidal flats
Jetty; Launching ramp

Built-up area with commercial centre

Roads maintained for continuous public use: Primary road (sealed); Secondary road; Bridge (sealed / unsealed); Minor road (unsealed)

Roads of restricted use or access: Other roads; Vehicular track; Gate

Walking track; Bridge
Railway; Station (Karoola)
Light railway
Power transmission line and pylon positions
Building; Feature of special interest; Ruin; Mine (Pleasant View)
Post office; Police station; Fire station; School (PS; FS)

BOUNDARIES shown on this map are NOT authoritative. For full particulars please consult the Registrar-General's Department or the Lands Department.
Property and land parcel boundaries are shown as at September 1981.
Areas within proclaimed towns or less than two hectares are not depicted. To give a land parcel reference, prefix parcel number with municipal number.

Municipality name
Municipality number
Municipality boundary
Ward name
Ward boundary
Town boundary
Reserve boundary
Property boundary; Land parcel boundary and number (e.g. 0371)

PROJECTION: Universal Transverse Mercator (UTM).
HORIZONTAL DATUM: Australian Geodetic Datum 1966.
VERTICAL DATUM: Australian Height Datum (Tasmania) excepting offshore islands whose datum is mean sea level.
GRID: 1000 metre intervals of the Universal Transverse Mercator Grid, Zone 55 (Australian Map Grid), Australian National Spheroid. Grid values are shown in full at the south west corner of the map.
CONTOUR INTERVAL: 10 metres with 50 metre index contours.

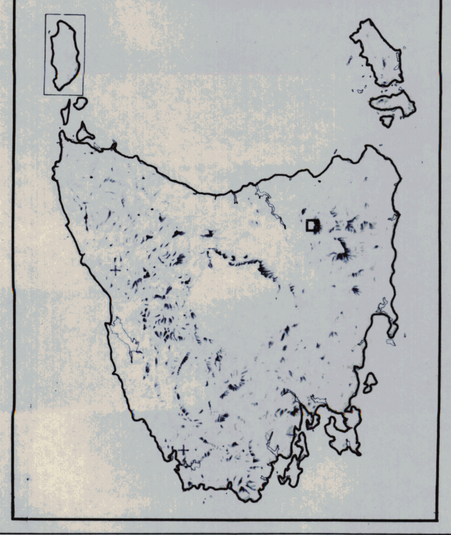
WORLD GEODETIC SYSTEM 1972: To convert co-ordinates from this system to Australian Geodetic Datum 1966, increase the value of latitudes by 5.3" and decrease the value of longitudes by 4.2". To obtain heights decrease satellite heights by 3 metres.

MAGNETIC VARIATION: True, Grid and Magnetic North are shown diagrammatically for the centre of this map. Magnetic North is correct for 1981 and moves easterly about 0.1° every three years.

GN
TN MN
GRID CONVERGENCE 0.7°
GRID / MAGNETH ANGLE 14.1°

MEAN TEMPERATURE RAINFALL
For temperatures at higher elevations subtract 1°C for every 100 metres above station.
J F M A M J J A S O N D

LOCATION MAP



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APPENDIX 1

BURNS CREEK ROCK CHIP SAMPLING

Sample No:	As (ppm)	Au (ppm)	Description
BC1	150	10.50 (8.60)	Vein quartz from dump, main adit.
BC2	110	9.70	Vein quartz from dump, main adit.
BC3	1000	0.60	Mathinna Gp, ferruginous, brecciated vein quartz. Dump, main adit.
BC4	870	0.50	Mathinna Gp, sheared, ferruginous minor vein quartz. Dump, main adit.
BC5	590	0.50	Mathinna Gp, sheared, ferruginous vein quartz. Dump, main adit.
BC6	180	6.10	Massive vein quartz, minor ferruginous vugs. Dump, main adit.
BC7	180	4.70	Tailings sand (crushed) 100 metres north of main adit.
BC8	200	3.80	Tailings sand (crushed) 100 metres north of main adit).
BC9	16	0.02	Mathinna Gp slate. Roof, main adit.
BC10	22	0.01	Mathinna Gp. Dump 20m SW of adit entrance.
BC11	14	0.01	Mathinna Gp. Dump 30m SW of adit entrance.

BC12	11	0.01	Mathinna Gp. Dump 80m SW of adit entrance.
BC13	910	7.60	Vein quartz. Dump. Open stope 13 metres north of BC12.
BC14	730	17.30	Vein quartz. Dump. Open stope 13 metres north of BC12.
BC15	10	0.01	Logging road traverse. Composite chip samples of slates, sandstone, siltstone, minor vein quartz.
BC16	10	0.00	"
BC17	8	0.00	"
BC18	11	0.00	"
BC19	21	0.00	"
BC20	63	0.01	"
BC21	150	0.01	"
BC22	130	0.00	"
BC23	170	0.03	"
BC24	140	1.10	Mathinna Gp and vein quartz. Dump trenches 230 metres NW of main adit entrance.
BC25	240	23.10 (32.80)	Mathinna Gp and vein quartz. Dump 10 metres west of open stope.
BC26	960	6.30	Mathinna Gp and vein quartz. Dump, open stope 35 metres west of BC 25.

BC27	160	0.10	Mathinna Gp. Dump, cross cut trench, 50 metres west of BC26.
BC28	920	1.00	Mathinna Gp. Dump, shaft 15 metres west of BC26.
BC29	160	0.02	Logging road traverse. Composite chip samples of slates, sandstone, siltstone and minor vein quartz.
BC30	150	1.30	"
BC31	84	30.60 (36.10)	Vein quartz, ferruginous, vuggy. Dump, main shaft 100 metres west of main adit entrance.
BC32	170	7.70	Mathinna Gp and vein quartz, oxidised and tectonically deformed. Dump, main shaft.
BC33	620	0.04	Mathina Gp and vein quartz, oxidised and tectonically deformed. Dump, main shaft.
BC34	6	0.01	Mathinna Gp grey slate. Dump, main shaft.
BC35	6	0.01	Mathinna Gp slate. Dump, main shaft.
BC36	21	12.20	Massive vein quartz. Dump, main shaft.

REPORT ON FLUID INCLUSIONS FOM THE SCAMANDER AREA, MAY, 1988.

G.J.DAVIDSON.

INTRODUCTION

Vein quartz samples NE1, 2 & 3 were analysed for fluid inclusions, and in the case of calcites from NE1, analysed for carbon and oxygen isotope composition. Prior to this analysis, thin-sections were prepared and examined, primarily to assess the viability of fluid inclusion work. The aim of the study was to differentiate between a magmatic and a metamorphic source for the fuids depositing vein quartz in sites apparently removed from granite contacts, hosted in the Mathinna Beds. This is in fact a controversial area of geological science, with often ambiguous answers. This fact is probably evident from the length of this report!

PETROGRAPHIC DESCRIPTIONS

NE1 : A relatively to completely unstrained mosaic of interlocking anhedral vein quartz, cut by regular thin parallel joints thoughout, 1-2mm apart.

Arsenopyrite occurs as euhedral cubes and diamonds <1% , up to 1.5mm long, but no gold was observed.

Fine fluid inclusions are abundant throughout. Parallel fibre quartz is generally inclusion-poor, but clear quartz , cut by swathes of secondary inclusions, are more abundant than in NE3.

NE2: NE2 does not contain sulphides. The milky quartz fabric has a strong parting within it, along which numerous fine fluid inclusions occur parallel or perpenicular to the vein walls. Some later tectonism is implied by recrystallised quartz grains. The general character of the rock is similar to NE3, which is described more fully.

NE3: This rock consists of vein quartz grains up to 3mm in length, averaging 0.5mm diameter. Most grains are anhedral, although fine semi-polygonal zones occur at some boundaries with sulphide grains. Sulphides are disseminated throughout the vein quartz, comprising < 1%, in grains averaging 1mm diameter. They consist mainly of anhedral galena with characteristic triangular pitting, overgrowing euhedral diamonds of arsenopyrite (ie arsenopyrite preceeds galena in the paragenesis).

The rock fabric is defined by variations in fluid inclusion density and the size of individual inclusions. The prevalent fabric is made up of short lengths of individual fine inclusions parallel to one another over 2-5mm,

which interlock with other similar patches with differing inclusion-train orientations. No inclusions of usable size occur in these areas.

A second fabric type is a clear relatively inclusion-free quartz. This is found in radiating zones around sulphides, within quartz inclusions in sulphides, and occasionally in isolated areas amongst the prevalent fabric type. Identifiable inclusions derive from these areas.

FLUID INCLUSION DESCRIPTION

NE2 and NE3 have been used in this study, but NE1 was not used because of the smallness of its inclusions. The two main types are:

1) Two phase CO2-rich inclusions 5-20 μm in diameter, with negative to irregular shapes, occurring randomly.

2) Aqueous inclusions with a low phase volume of vapour, and an occasional halite crystal. A complete transition exists between this and the CO_2 inclusions.

INTERPRETATION OF VEIN TEXTURES

There is only slight evidence for post-vein deformation, and the lack of alignment of inclusion planes infers a primary origin. The fine-grained linear quartz fabric is attributed to crack-seal processes in vein-development, where these areas were the rapidly growing fibres of quartz in the vein. Clear inclusion-rich areas probably post-date the crack-seal processes, and represent slower-growing crystals. Notably sulphides are associated with this point of vein evolution.

RATIONALE BEHIND THE USE OF FLUID INCLUSIONS

In many ore deposits, the fluids trapped in cavities as minerals grew are diagnostic of the deposit-type. From the analysis of inclusions the minimum temperature of formation can be deduced, as can the fluid salinity, and other aspects of its composition such as the presence CO_2, CH_4, N_2 and H_2S. The density of the inclusion can be deduced from the homogenisation of a vapour into a liquid phase, and this can in turn be used to make estimates of the trapping pressure and temperature of inclusions. Note that the T_h quoted in this work is the minimum temperature of formation for the fluid inclusions.

The question of the source of fluids for Au veins in a variety of sites is certainly one to which fluid inclusions can contribute. It is, however, a "sticky" subject because of the ambiguities of fluid convection which produce veins. Most workers now regard veins hosted entirely by granite, or spatially related to granite apophyses, as granite-derived in part. In contrast "Slate belt"-style, such as the Victorian gold-fields or Globe-

Progress fields in New Zealand, are now widely believed to derive from metamorphic fluids. However, both types often have similar mineralogies and element associations. Sulphides are generally low, dominated by arsenopyrite, pyrite, stibnite and trace base metal sulphides. They are generally derived from reduced fluids. Where uncertainty develops is with deposits in low-grade metamorphic terrains intruded by granites, where the veins may bear no obvious association with granitoids. Many Australian gold-fields are in this category, including sections of the Lachlan fold belt, and the Pine Creek field of the Northern Territory. The veins studied here are also apparently in this category.

Interpretative problems clearly develop because of the mechanisms of quartz vein formation in the mesothermal environment. The separation of an aqueous phase is a consequence of the cooling and crystallising of hydrous magmas. In high-level magmas such as those of the Blue Tier Batholith, overpressuring can lead to fracturing and consequent release of the aqueous phase along cracks into the wall-rocks. Here it may mix with convecting waters before depositing its constituents. Modern thought is that the fluid mixing itself may induce depostion, although the sudden pressure release often leads to second boiling which also can deposit metals, and is important in the development of a very saline fluid. The end result may be a deposit with the isotopic characteristics of connate or metamorphic waters. In many cases therefore, it is impossible to give a definite answer to the question of magmatic or metamorphic origin on the basis of isotopic or fluid inclusion data. A leaning towards a particular source may be influenced by comparison with a suite of factors, including fluid composition, as outlined in the description of the two endmember fluids below.

	GRANITOID HOSTED	"SLATE BELT" STYLE
RELATIONSHIP TO STRUCTURES	Veins post-date cleavages, shears. Veins in tensional directions with repect to granite intrusion.	Veins in dilational sites in folds, localised on dip changes fold-hinges, splays, contacts
RELATIONSHIP TO GRANITES	Spatially close to or enclosed by granites, or shears related to intrusion.	No relationship to granites.
FLUID SALINITIES	Moderate to very high salinities, > 5wt. % equiv. NaCl.	< 5wt. % equiv. NaCl, unless influenced by evaporites.
INCLUSION VOLATILE Complex CONTENT	Variable, but CO2 generally present CH4 uncommon, due to moderately oxidised nature. In the aqueous phase the hydrolisation of SO2 to form H2S often results in fO2 in equilibrium with hematite.	Non-metamorphic: hydrocarb., CH4, H2O, CO2 dominant. Illite-grade: CH4 Pyrophyllite: (~ 350 C), -H2O dominant + CO2. ≥ Staurolite : CO2 dominant ie METAMORPHIC GRADE DEPENDENT.
TEMPERATURE	Close to granite temperatures up to 725 C, decreasing away from the pluton.	Vein P-T should reflect metamorphic grade of host.

RESULTS

NE3

The two inclusion types have the following fluid characteristics:

1) *CO2-rich*: (n=14) These homogenise in the range of 277.8-305.2C (T_h), and ~~ices~~ CO_2 melt at -56.4 C (T_m), although one had a T_m of -60.8°C. A liquid to vapour transiton occurs at 11.9-12.7 C suggesting CO_2 had a density of 0.87 g/cc.

2) *Aqueous*: (n=6) Small vapour bubble, and occasionally a halite crystal. Most homogenised between 302 - 364 C, and have salinities ranging from 3.37-26 wt% eqiv. NaCl. A density of 0.63g/cc is implied.

NE2

1) *CO2-rich:* (n=9) T_h= 28.4-505 C, $T_m(CO2)$=-54.8- -43.9 C, $T_m(H2O)$ = ~-10.7, equivalent to 14.6% NaCl. Density= 0.82 g/cc.

2) *Aqueous*: (n=5) T_h= 139.9-253.9 C, T_m~ 0 C, very low salinity, Density~ 0.87 g/cc.

This data, and the mode of the inclusions in having a spectrum of proportions of CO_2, suggests that NE3 inclusions may have been deposited during boiling. An important support for this is the overlap of homogenisation temperatures. Low to high salinities are indicated. CH_4 may be present as a trace in some inclusions, but is generally absent. Homogenisation temperatures are higher in NE2 than in NE3 for CO_2-rich inclusions, whilst the aqueous inclusions are lower, tending to rule out boiling in NE2. The NE2 inclusions suggest rather that with time the cooling fluids passing through the NE2 vein evolved from CO2-rich to being H20 -rich.

EVIDENCE FROM CARBON AND OXYGEN ISOTOPES OF CALCITE IN NE1

CARBON ISOTOPES(average NE1 value =-10.781 PDB $\partial^{13}C$).

Carbonate carbon in hydrothermal ore deposits is fixed in oxidised and reduced species in the fluid, derived from

1) a magmatic source

2) oxidation of reduced carbon in sediments (mainly), and

3) sedimentary carbonates, by decarbonation or leaching.

Each of these contributes carbon with different isotopic signatures, considered as (using the constraints of the the N.E.Tasmania geology):

1)felsic igneous -- derived from the melting of crustal rocks, with CO_2 dominant in the fluid: -2 to -12‰ .

2) oxidation of reduced carbon in Mathinna Beds. This should generally contribute carbon <10‰, with the proviso that enclosed fluid inclusions contain CH_4

3) Sedimentary carbonate: 0± 2‰

The signature of the fluid is preserved in the calcite if temperature of deposition was greater than about 200 C. With the constraint that CO_2 is

dominant in the vein fluids, the average value of -10.781 suggests a magmatic origin for the carbon.

OXYGEN ISOTOPES (average NE1 value = 9.261 $\partial^{18}O$ (SMOW).

Oxygen isotopic compositon of carbonate is ambiguous with regard to its origin. This is because the fields of magmatic and metamorphic fluids overlap ie 7-13‰, and 2-20‰ respectively. The calculated ∂O^{18} fluid composition for NE1, assuming a minimum average temperature of formation of 400 C, is 7.5‰, and lies within both fields. It is important to note however that many Au vein deposits studied by Wilson and Golding(1988), and ascribed to a deep-seated metamorphic origin, had carbonates with $\partial^{18}O$ in the range 12-21.1‰, and by their own criteria the value of 9.6‰ would certainly be considered magmatic.

SUMMARY AND CONCLUSIONS

The fluid and isotopic characteristics of Au-rich samples containing galena and arsenopyrite suggest a dominantly magmatic origin for the ore fluid.

The compelling magmatic features of the fluids are their moderate to high temperatures, and moderate salinities (whereas metamorphic fluids are generally low in salinity), and their low CH4 content (whereas a metamorphic fluid derived from the pyrophyllite-grade carbonaceous Mathinna Beds should contain appreciable CH4). The carbon and oxygen isotope values are also convincingly magmatic, particularly compared to values from true "slate belt" vein provinces. Note however that if metamorphic fluids had reacted with a metamorphic basement of mafic igneous rock then they could inherit a magmatic signature as is thought for the Ballarat -Bendigo deposits.. No such metamorphic basement is to my knowledge known to underlie the N.E. Tasmanian province.

REFERENCES

Wilson A. and Golding S.(1988)-- Stable isotope constraints on fluid sources for granitoid and metamorphic-hosted gold-quartz vein deposits in Eastern Australia. Gold'88 Poster Vol. 2, P. 495.

SAMPLE
NE1 : Trafalgar Granodiorite + quartz + carbonate.
NE2 : Burns Creek Mathinna Group + quartz.
NE3 : Portland vein quartz.