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PLUTON MINERALS N.L.

REX HILL MINE
AVOCA, TASMANIA

2nd June, 1970

HALL [illegible] AND ASSOCIATES PTY
6TH FLOOR
36-38 [illegible] STREET, SYDNEY, 2000, AUSTRALIA

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GEOLOGICAL & EXPLORATION CONSULTANTS

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I INTRODUCTION

1. General

This report refers to information compiled from a brief examination of the mine and perusal of some Department of Mines reports. Numerous reports are available concerning geology, grades, metallurgical tests on the ores and past production records. Due to flooding of the underground workings only a surface examination was possible.

2. Location and Access

The mine is located 6.6 road miles northwest of Avoca in east Tasmania. Access is good, however some expenditure on the last 1.2 miles to the mine would be required to form an all weather road.

3. Topography

The mine is situated 2,000 feet above [illegible] level on the steep southwest slopes of Mt. Rex. Adequate timber and water is available.

H.E.C. POWER

4. Lease Tenure

The area is held as two adjoining ten acre leases, 48M/64 and 94M/64 by R. Brinckman and ~~D. Fisher~~. It is not known whether water rights are held over sufficient dams and races for large scale mining.

II GEOLOGY

1. Regional Geology

The mine is located on the south western margin of a faulted wedge of Upper Devonian granite (the Ben Lomond Granite). This granite is a northwest trending elongated mass 4 miles long and 1 mile wide, and has associated with it significant tin and tungsten mineralization. Immediately southwest of the mine the granite is in contact with a downfaulted block of Jurassic dolerite. This contact lies along the northwest trending Castle Carey fault which has a vertical displacement to the southwest of 1,500 feet. To the northeast the granite is overlain by Permian sandstones and gravels. Recent erosion has formed some tin bearing eluvial ground which has been sluiced in places.

2. Detailed Geology and Mineralization

a) Rocktypes

There are two granite facies recognised in the mine area, a coarse grained porphyritic granite and a microgranite or fine grained porphyritic granite. The contact between these two types is irregular. The mineralization appears to favour the coarse grained type. An aplite dyke is recorded in one excavation.

b) Structure

i) Jointing

Three separate sets of jointing are recognised. The first set trends in a northwest-northnorth--west direction parallel to the direction of major faulting and dips at variable angles to the southwest. The second system of vertical joints trends in a northerly direction and is associated with greisen leaders. The third system trends 45° - 70°M with a steep dip. The excavationson mineralized bodies trend north so the second joint set may be a structural control.

ii) Shearing

There is some shearing in the granite and this trends 75° - 80°M.

c) Quartz Greisen Leaders

In places these leaders are cassiterite bearing and are mainly disposed along two general directions one of which corresponds to the trend of a joint system, the other to a shear trend. The leaders occur in most of the excavations and are either cassiterite or tourmaline bearing. They usually trend 350° - 20°M.

d) Mine Development (See Figure 1)

Underground development at Rex Hill has been confined to the Main Orebody and its associated orebodies. Other workings consist of shafts, pits and trenches on narrow greisen leaders and veins some of which are tin bearing. The main workings consist of three levels down to 300 feet.

e) Orebodies from Urquhart (1966) and Blissett (1959)

i) The Main Orebody

This is exposed in a 60 foot wide open cut as a cassiterite bearing greisen pipe. The pipe plunges 80° on an azimuth of 105°. The centre of the pipe consists of a crystal quartz/greisen core with numerous vugs. The core has an oval surface expression with dimensions - 40 feet by 25 feet and is surrounded by an aureole of greisen and/or silicified granite. This aureole carries the best tin values. The orebody is fully exposed in the the open cut and consists of the quartz greisen core and altered aureole rock which lies in irregular contact with relatively unaltered coarse grained porphyritic granite which may also be tin bearing in places. In the north of the open cut the boundary of altered aureole rock and coarse grained granite appears to be controlled by jointing. The orebody has been almost completely stoped out down to the No.2 level and has been proved between the No.2 and No.3 level. According to Henderson (1935), however, it does not persist to the No.3 level. At the surface the orebody is ellipsoidal and has total dimensions 70 feet by 55 feet, on No.2 level it is 110 feet by 56 feet. It seems reasonable that it continues

to have some expression at the No.3 level (a further 80 feet down). Observations do not support this, however, and the reason will be discussed under; Section III (1..General Summary).

ii) The White Orebody

This orebody was discovered in the west crosscut off No.2 level and lies apparently 15 feet west-south-west of the south end of the Main Orebody. A winze was sunk to a depth of 31 feet from No.2 level. Although there was some alteration of the granite along joints trending 303°M, the tin content was under 0.38%, and a crosscut on No.3 level designed to explore the lower part of the orebody indicated only traces of mineralization. This deposit may be a bulge in the Main Orebody.

iii) The No.3 Level Orebody

This is an almost vertical vein with an easterly strike, and is exposed about 700 feet north-west of the shaft. It was also cut at the north end of No.2 level. On No.3 level the body is cut off by a plane dipping west at 70-80°.

iv) The North-South Vein

This is a vertical vein between three and four feet wide striking north and forming the northern extensions of the Main Orebody. It was cut in shallow shafts away from the main workings.

f) Mineralization

Minerals recorded in the main orebody include cassiterite, arsenopyrite, pyrite, sphalerite, chalcopyrite and galena containing silver. The sulphides are deleterious to the average assay and saleability of the tin concentrate. Cassiterite is recorded in vugs in the crystal quartz greisen core. The sulphides are mainly restricted to this core and occur massive in vugs

or as disseminations. Sphalerite, galena and pyrite are the most common sulphides.

The cassiterite is concentrated in the aureole rock and is emplaced 1) along very thin fracture foliations concentrically around the core. 2) in narrow veins cutting across this foliation.

g) Wall Rock Alteration

This consists of what has been termed greisenisation of the aureole rock although the lack of muscovite distinguishes the altered rock from true greisen. Accompanying this alteration has been the introduction of silica, chlorite and kaolin.

3. Production and Grade

Between 1893 and 1900 the Rex Hill mine produced 300 tons of ore which yielded 170 tons of cassiterite concentrate. Nye (1934) reported a total production of 826 tons produced up to 1913 most of which was produced before 1905.

In 1934 sampling of the No.3 level gave an average of 1.39% tin, over eight samples, all except two samples ranging between 1% and 3.1%. In 1935 Henderson made a detailed examination of No.2 and 3 levels. Twenty samples were assayed and the tin content ranged between 0.01% - 3.7% There is definite confliction between Nye's (1934) and Henderson's (1935) sampling results. The low assay values for the No.3 level may indicate that the pipe has been completely missed since production ceased due to falling grades on No.3 level. For a tabulation of sample assays see Table 1.

4. Ore Reserves From Urquhart (1967) and Henderson (1953)

The ore reserve calculated for the aureole rock on the western side of the open cut down to the adit level is approximately 1,000 tons assuming a tonnage factor of 13 cubic feet/ton. The grade may vary between 2.2% - 4.8%.

The reserve of the crystal quartz/greisen core is approximately 2,300 tons; but the grade is unknown. Henderson states that the pipe has been removed almost entirely above No.2 level.

III SUMMARY

1. General Summary

The following factors need to be considered when deciding whether the Rex Hill Mine is worth further investigation.

a) The indicated ore reserves are uneconomic and further reserves need to be proved. Assuming no further ground is available at least part of these reserves would have to come from the known pipe.

b) The mining engineering aspects of extracting ore from the greisen pipe would require investigation.

c) Further pipes may have to be uncovered and proved before sufficient reserves are available.

d) Does the grade fall off with depth and at what level is it likely to be uneconomic?

It is stated that the mine closed due to low grades encountered on No.3 level. At Ardlethan, N.S.W. a cassiterite bearing pipe showing strong similarities to that at Rex Hill was mined to a depth of 680 feet in the Carpathia Mine - apparently still in economic grades. Comparing the Rex Hill to the Carathia Mine Urquhart (1967) has proposed a diatreme origin for the pipe thus suggesting that it has reasonable depth continuation. Henderson (1935) on the other hand believed that the orebody was an irregular "bulge" type, localised at intersecting joint and shear loci. Henderson's theory is probably based on his observations that the pipe did not occur on the No.3 level and that the narrow greisen leaders

observed were feeders to the main orebody above.

If Blissett's (1959) mine plan (see Figure 1) is correctaand the dimensions given for the pipe on No.2 level are also correct (see section on the Main Orebody) then the pipe appears to plunge 75° and not 80° and in fact appears to be increasing its long dimension with depth.

Assuming that Blissett's plan of the No.3 level is correct it seems that these workings may not have intersected the pipe at all and that it in fact lies to the northeast of the longest crosscuts on the level. This would explain Henderson's inability to observe the pipe at that level and the low grades encountered which led to the mine closure. Whether the pipe does in fact continue at depth with suitable grades (say to 600 feet) could be determined by drilling. An unconfirmed report by an old miner that rich tin ore was discovered in further cuts on the No.3 level may therefore be correct.

e) Would the complex nature of the ore make it difficult to treat and sell, bearing in mind that the percentage of sulphides usually decreases with depth?.

2. Conclusions

This mine may be economic depending on the proving of suitable reserves and the favourability of an engineering study on mining methods and suitability of the ore for treatment. Full information regarding past production, mines inspectors reports and sample assay from Nye's (1934) report has yet to be received.

3. Recommendations

It is recommended that:-

i) All available assay, structural and geological information should be plotted on the most accurate mine plan available, in order to determine the likely extensions of the pipe below the No.3 level.

ii) One or two exploratory diamond drill holes should be drilled to intersect the supposed extension of the pipe.

iii) Dependent on suitable grades and intersections from the above drilling an engineering study on the mining methods and feasibility of exploiting any proved ore reserve should be carried out.

iv) Dependent on the above engineering study further drill holes should be planned.

v) If after a number of (say 4) drill holes are completed and results are suitable; the mine should be dewatered sampled, geologically mapped and underground development commenced with further reference to mining aspects.

vi) Costeaning be carried out on a greisen outcrop reported to the south of the old mill site.

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TABLE 1

Assays of samples collected during examination of the mine and treatment plant at Buffalo Creek.

Sample Descriptions

1) Rock Samples

RR1 Single specimen, single site from boulder at edge of open cut. Very strongly developed chloritic alteration in wallrock.

RR2 Composite sample from random boulders around shaft 400 feet south of main shaft. Graphic granite with numerous sulphide cavities, chloritic and kaolinitic alteration.

RR3 Composite sample from 2 boulders on dump 20 feet south of above shaft. Possibly from bottom of workings. Graphic granite, pyrite, some tin and alteration similar to RR2.

RR4 Sample of composite rock and weathered material from trench and dump 50 feet south of above shaft. Greisen granite with sulphide staining. Some cassiterite.

2. Concentrate Samples

From treatment plant on Buffalo Creek.

RC1 Oversize tailings for return to secondary crusher.

RC2 Sulphide concentrate from table flotation.

RC3 Reject tailings from table?

RC4 Concentrate? or reject tailings from table.

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ASSAYS

	%								oz/ton
	Sn	WO_3	Cu	Pb	Zn	Fe	Bi	As	Ag
RR1	Nil	Nil	Trace	Nil	0.10	5.6	Nil	Nil	Nil
2	Trace	Nil	Trace	Nil	Trace	3.0	Nil	Nil	0.4
3	Trace	Nil	1.08	Nil	0.17	4.8	Trace	Nil	3.6
4	0.22	Nil	0.28	Trace	0.08	3.6	Trace	Nil	1.4
RC1	2.33	Nil	1.00	1.60	9.6	8.0	Trace	0.8	5.0
2	1.72	Nil	3.30	13.2	20.8	11.4	0.08	0.7	27.5
3	4.75	Nil	0.56	0.60	3.4	5.3	Nil	Trace	1.4
4	9.33	Nil	1.20	1.10	7.8	8.2	Nil	Nil	2.9

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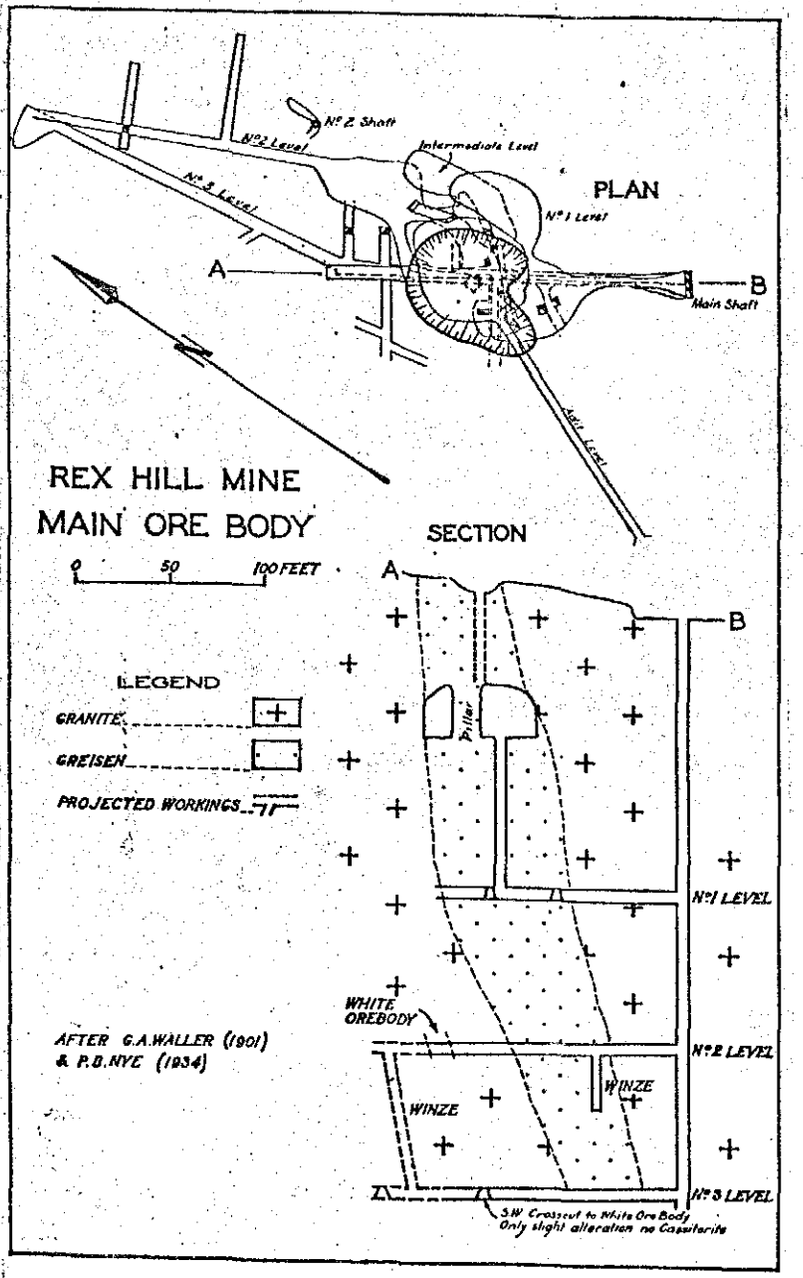

Fig. 18—Sketch section and plan of Rex Hill Mine.

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REX HILL MINE

MAIN ORE BODY

FROM BLISSETT (1959)

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