

REPORT

MOUNT PARIS TIN MINE.

Branxholm, Tasmania.

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Melbourne.

3rd January, 1935.

COPY.

Mount Paris Tin Mine.

General Conclusions.

Examination of the Mount Paris leases leads to substantial confirmation of the figures put forward by Mr. E. W. Bonwick in regard to quantities and values.

About 2,000,000 cubic yards at least of apolitic material can be realised by sluicing and the Tin value of this yardage is put somewhat conservatively at  $2\frac{1}{2}$  lbs. Tin Oxide per cubic yard.

An unknown but very large quantity of tin bearing griesen of undetermined value is available in scattered blocks, lenses, and lode formations, to be realised as a by-product of sluicing and by ordinary mining methods.

The realisation of the value of the deposits must be regarded as a definitely large scale project and operations be planned to handle the maximum output possible with the water available particularly in taking advantage of the much greater winter flow.

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Mount Paris Tin Mine.Branxholm, Tasmania.Locality, Access, etc.

The mine leases are situated about 5 miles South-Easterly from Branxholm on the North-East Railway Line, 56 miles from Launceston.

A formed road presenting no transport difficulties is available for 4 miles from the railway towards the mine and the extension of this for about one mile, with grading to rise 500 feet to the mine workings would be necessary to give reasonably useful access.

Leases cover an area of 241 acres, including the original leases, Bakhaps Lease and the two new 20 acre blocks.

Description of Area.

Mount Paris, prominent because of its coned rocky summit, is the highest point of the area, standing over 1800 feet above sea level, and the North-Western and Southern slopes of the mount form the main part of the leases.

The Southern slope falls about 1000 feet to the Dorset River and on this slope the main development of tin bearing material has occurred; the North-Western slope is, however, also definitely tin bearing and warrants close examination.

The whole area has a granitic aspect with remnants of overlying altered slates and sandstones encroaching on the main central granitic exposures.

The granitic mass exhibits gradations from porphyritic granite to the aplitic and griesen phases and it is these latter types, known locally as aplite and griesen, that are of importance in being the main tin bearing rocks. These terms are distinctive and self-explanatory and can be

conveniently used to advantage in any description of the area.

The aplite has a surface exposure of at least 900 x 700 feet and extends from around the summit of Mount Paris to a vertical distance of at least 200 feet down the Southern slope.

The aplite mass is kaolinised and friable to a depth yet undetermined and in the old tunnels and recent bores no limit to the friable depth has been found.

Included in the aplite are masses of griesen apparently lenticular with a general trend a few degrees North of West. These are hard little decomposed quartz masses definitely carrying tin values.

Griesen also occurs extensively along the line known as the Appalachian Lode which has been opened by surface cuts over a length of 1000 feet and has also been pierced by No. 3 Tunnel. This and apparently similar griesen occurrences in Bakhaps Lease are quite extensive and while carrying more quartz than the griesen associated with the aplite, and suggesting at places pegmatite associations, are tin bearing wherever exposed.

Little attention has been given to these occurrences in recent work, but they appear to justify concentrated examination with the possibility of proving their value as producers on a large tonnage basis.

The slate series appears to form a fairly continuous covering to the aplite on the North-West and East sides and the Southern side is formed by porphyritic granite. Slaty remnants are included also in the aplite mass.

#### Tin Occurrence.

Tin Oxide occurs consistently in the aplite and griesen and in quartz leaders running through both, and dish prospects taken anywhere in the area from these two rocks never fail to show appreciable quantities of Tin Oxide.

Enrichments in the form of segregations, veinlets, and coarsely crystalline masses occur frequently and in the griesen in particular, reliable small quantity sampling is impossible.

Exploration of the deposits; has been by tunnels, open cuts and boring and attention has latterly been directed to proving a sufficient yardage of friable aplite to justify extensive development and equipment for sluicing this on a large scale.

The examination in more detail of the old workings on the Appalachian Lode and the Griesen Lodes in Bakhaps lease would appear to be fully warranted.

Quantity of Ore Available.

Aplite.

Examination of the area in detail, including old workings as far as accessible and consideration of results of recent boring, supplemented by results of a further series of six personally supervised bores at self selected sites, enables a preliminary estimate of the aplitic ore available to be made.

It can safely be assumed that at least 2,000,000 cubic yards of friable aplite suitable for sluicing is available.

To what depth the completely Kaolinised friable aplite will extend cannot be predicted, but nowhere can any indication be found suggesting a limit. Harder patches occur but these do not appear of great significance and may be regarded as local areas which have been shielded from free circulation of surface waters by neighbouring griesen lenses.

The extension of the aplite under the slate series covering is quite indefinite and it is possible that the rate of increase in thickness of the slate will be so small that undue overburden depth will not prevent the inclusion

eventually of further large yardages of aplite available for sluicing.

Griesen.

These tin bearing formations occur irregularly in the aplite and while approaching more nearly to defined continuous lodes in the granite and slate series much more opening up would be required to enable estimates of tonnage to be made.

That a very large tonnage could be realised is evident. In the case of the Appalachian Lode old workings extend to shallow depths over a length of over 1000 feet while in Bakhaps lease old workings can be followed for many hundreds of feet in length.

These griesen occurrences are hard enough to require mining by ordinary methods, facilitated by sluicing where included in the aplite, and they would provide excellent crushing material.

Values.

Aplite.

Consideration of previous records of sampling of tunnels, etc., boring results and the personal handling of nearly 40 bore samples and many dish prospects from all parts of the area, lead to a general confirmation of the valuable nature of the deposit.

After liberal allowances for the influence of the enrichments previously referred to, more particularly in consideration of boring results, the two million cubic yards of friable aplitic material available for sluicing can be conservatively estimated as carrying  $2\frac{1}{2}$  lbs. Tin Oxide per cubic yard as a general average.

Griesen.

No estimate of values can be offered on account of the nature of the occurrences. Sampling by any small quantity method cannot give anything but erratic unreliable results.

The only test of values will be the result of bulk crushings in comparatively large quantities from each of the main exposures.

There is visible tin oxide in large quantity in the griesen and to the eye it is distinctly more impressive than in the aplite. Coarsely crystalline masses and well formed crystals of pea size and larger are abundant and fine tin is visible in practically every stone handled.

The impression is undoubtedly given that the griesen is important and should not be neglected, and in the plans for working the property equipment should be provided for testing in a comprehensive way.

The surface shedding from the griesen gives remarkably rich dish prospects wherever tried and the occurrences of griesen on Bakhaps lease should be considered with a view to provision perhaps of independent equipment for their exploitation.

#### Water Supply.

The existing scheme bringing water to the property by a race  $6\frac{1}{2}$  miles long with no inlet storage has proved inadequate for large scale operation and fails altogether during dry periods.

To supplement this the Morning Star Scheme reported on by Mr. Donald Fraser will provide a much larger supply and with storage at the race inlet is calculated to ensure a good working supply over three months with no intake.

This scheme inspected under the guidance of Mr. Fraser includes a dam 40 feet high built on the Tasmanian Brush Fill plan, closing the narrow outlet of an excellent natural basin. Ample by-wash provision is allowed for.

The catchment area supplying this basin is almost bare of vegetation and the exposed rock surfaces should assure the 50% run off estimated. Rainfall over this area is stated at 60 inches per year.

Inspection of the dam site and catchment area with Mr. Fraser gives confidence in the suitability of the proposal for supply and the adequacy of the storage.

It was not possible to inspect the race line estimated at from 10 to 12 miles from the dam site to the mine.

This proposed race is to deliver water at about 100 feet above the existing open cut floor and about 160 feet above the proposed point of attack.

This level of delivery will not give sufficient head for working the upper part of the aplite, but in the future when this higher ground comes to be worked, boosting of the pressure can be resorted to.

It is important that the outlet end of the race at the mine, be kept as high as possible consistent with reasonable additional expenditure, as every foot of extra head will be of advantage in breaking down and disintegrating the aplite with the nozzles as well as commanding the maximum possible yardage.

To supply power for lighting and general purposes on a limited scale, part or all of the water used for sluicing and treatment could be used, after clearing in settling dams, for power generation by taking advantage of the further fall of 400 to 500 feet to the Dorset River.

Costs, Possible Profits, etc.

With tin at £220 = 2/- per lb. nearly and costs at 1/- per yard, which figures should not be exceeded providing the yardage handled per annum reaches the estimated figure of 360,000 cubic yards, the head value of  $2\frac{1}{2}$  lbs. SnO<sub>2</sub> per yard at a recovery of 80% in 70% Sn Concentrates would give a profit of 1/9 per cubic yard, say £30,000 per year, less realisation charges, and not allowing for exchange.

F. VOSS SMITH

3rd January, 1935.

WELDBOROUGH,

TASMANIA.

28th, December 1934.

E. W. Bonwick Esquire,

HORNSEY. N. S. W.

Dear Sir,

RE. WATER SUPPLY FOR SLUICING AND POWER AT MT. PARIS.

Having investigated all possible sources for supply of water at suitable height and volume, I decided that the Cascade River has the advantage required, and this report is purposed to explain the possibilities of conveying adequate water from that source to the Mt. Paris Tin Mine.

DESCRIPTION OF DAM SITE, WATERSHED, ETC.

Rising from slopes of a range of mountainous country in neighbourhood of Mt. Victoria and known locally as The Star of Peace, at a height of 2500 feet above sea, the Cascade joins the Ringarooma at 500 feet elevation in about twelve miles, the total fall being 2000 feet and watershed of approximately 30 square miles includes tributaries such as Eastern Branch (Minnie Jessop), Britannia, Dawn of Hope, East, and Tin Pot Creeks from other high sources.

The schemes for Mount Paris includes four square miles on 2560 acres of watershed on the upper lengths of the Cascade from Morning Star Flat 1700 feet, to Star of Peace 2500 feet. Until about 35 years ago this area was densely covered with a forest of Myrtle, Sassafras, and Celery Pine timber with heavy scrub, tree ferns and mosses. This growth retarding the flow of rainfall to the creeks and rivers gave a steady distribution of water for mining by means of water races with a few small dams to conserve night water. Conditions now have completely changed. Bush Fires have completely denuded the hills of live timber and in most places the ground is bare excepting for grass. There is

practically no obstacle to the rush of water down the steep hillsides to the river and thence to the sea. Probably considerably less than five per cent of the rainfall is used for mining or any other purpose.

The Morning Star Flat is an ideal place for construction of dam to intercept and hold a small part of this wasted water.

A rainfall gauge at Morning Star was established by me with a daily observer and the co-operation of Government Weather Bureau for five years 1918 to 1923 or thereabouts. Five years' continuous observation showed a yearly average of 60 inches with a minimum of 55 inches and a maximum of about 63 inches. The gauge being at a height of 1700 feet with all the watershed above it, rising to 2500 feet, naturally recorded considerably less than the actual rainfall of the higher parts.

Contour levels have been taken at Morning Star. These show that at a height of 41 feet above base of proposed dam, the water level would have a surface area of 44 acres and mean depth of 16.3 feet. The dam wall and area under water will have a solid granite bottom and will be constructed of clay, gravel and earth by hydraulic-fill methods, helped in construction by smaller dams at 400 feet elevation for lifting and tail-race removal of material to dam wall.

A tunnel through granite under base of dam wall will provide a safe outlet for flood waters during construction until dam is completed with suitable by-washes on solid granite formation.

Adopting only 50 per cent of observed rainfall the number of times such a dam can be filled is easily computed on an acre-feet basis. 50 per cent when the rainfall has such a rapid fall to dam site should allow for all losses by evaporation, seepage, passing on of flowing water in dry periods to supply existing water rights, and escape of unusable water over by-washes when dam is full.

2560 acres x 2.5 feet = 6400 acre-feet = 8.86 filling of dam.  
 44 acres x 16.3 feet = 722 acre-feet D.F.

This gives a possibility of 50 per cent of rainfall filling the dam 9 times a year.

722 acre feet = 194 million gallons, sufficient storage to supply 12 Tasmanian sluice-heads to the mine for 75 days.

The driest months are January, February and March. It is considered that if water can be conserved for these three months with no assistance from rainfall, 12 sluiceheads can be used for 75 days - the average number of working days in three months, and at other periods of the year from 12 to 27 sluice heads.

12 sluice heads for 24 hours = 18 sluice heads for two eight hour shifts  
 27 " " " " " = 40 " " " " " " " "

If only 12 sluice heads be used throughout the year the dam would only need to be filled and emptied four times, thus using only 25 per cent of rainfall. This disposes of any argument that may arise as to possible interference with older water rights.

The watershed area of Morning Star Dam is so small and the position of dam so high, in the total watershed area of Cascade River, that full use of the dam can be made without disturbing any other user.

The dam as designed should cope with all normal conditions and give ample water at Mt. Paris both for sluicing and for water power. A period of three months so dry that no water would be available for storage is very unlikely to occur.

Thunderstorms are frequent in summer months, when a short violent squall would be sufficient to materially help the storage.

A complete survey of site of dam wall and positions and quantities of material available for filling will be required before a detailed estimate of cost can be made, but a preliminary estimate to cover complete costs including overhead expenses can be assumed at £15,000.

WATER RACE FROM DAM TO MINE.

Levels have been taken to all prominent or doubtful points along course of proposed race and although a detailed survey has not yet been made I have prepared a sketch plan on Government mining charts to show position and length approximately. There are no engineering difficulties, long siphons, or expensive work. The country is rocky and generally granite formation good for holding water. There may be one or two saddles to cut through to shorten length and possibly one short tunnel in vicinity of mine.

The race will be chiefly plain excavation and rock shooting deep enough to bottom in sound water carrying country, also assisted in places by stone and earth embankments locally known as "building" with occasional lengths of timbered fluming. The length, until further surveys are made, can be estimated at 10 to 12 miles and the capacity 40 sluice heads equal to 8,640 gallons per 24 hour day, or 360,000 gallons per hour. Grade of race about 7 feet, per mile estimated cost (without detailed survey) £6,000.

USE OF WATER AT MINE.

The outlet of race will be about 1625 feet above sea level or 110 feet above nozzle level in present working face. A suitable site for starting new face exists 100 feet lower, giving 200 feet pressure at nozzle level, or 86 lbs. per square inch.

A suitable place for power station is on bank of Dorset River South-Westerly from mine at approximate height 700 feet above sea.

If some of the water not required for sluicing be used entirely for power to generate electric energy for lighting or other requirements on mine, a fall of 900 feet in a mile and a quarter of pipe line will, allowing 100 feet to be lost by friction in pipes, generate 290 H.P. with 10 sluice heads over Pelton wheel of 80 per cent efficiency.

TIME TO CONSTRUCT RACE AND DAM.

Allowing three months for surveys and preparation of plans and specifications, with normal weather the above works can

be completed in twelve months. There need be very little delay in race work as construction can commence within a month of starting and be continued in summer months if possible.

The dam construction requires ample rainfall for hydraulic work and can be completed during the wet months of the year, May or June onwards.

Once completed, the race and dam will be valuable and continuous assets, growing better with the years, and available at their height above sea level to supply water for hydraulic or power purposes for an indefinite period.

Yours faithfully,

DONALD FRASER.