THE MICHAEL MOON TIN MINING CO.
by
T. H. Vincent Nov/1933

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THE MICHAEL MOON TIN MINING CO. N.L.

The following is a summary of an Engineering report prepared by Major T.H. Vincent - Mining Engineer - on the Michael Mine, North East Tasmania.

The report in full detail covers 17 pages of typing and is written with the idea of guiding a company capable of treating at least 4,000 tons of tinstone per week; he suggests that if difficulty is experienced in interesting large financial groups in the initial stages that the present plant can be improved an d enlarged in order to develop the property so that a good and promising face can be opened up and the stone that is at present in sight be utilised to supply the material for the Pilot Mill.

The report can be summarised as follows:-

SITUATION: The Northern end of the Blue Tier tin field near Poimena.

Poimena is connected to Lottah which is on the Main North-east Road from Launceston, and as all the roads are in good repait the communications can be regarded as good. (Motor cars can go right to the Battery.)

AREA & TITLES: These are detailed in Table 1 and show that the property consists of 94 acres of Mineral Leases, 5 acres Dam Site, 25 chains of Tramway Easement, 6 sluice heads of Water Rights, and 10 chains of Races.

TOPOGRAPHY: The areas can generally be regarded as flat, being relieved by the slopes of Mt. Michael and Little Mt. Michael. The South-east corner peg of the property is almost on the crest of Mt. Michael. (Note: The present quarry is at the foot of this hill).

GEOLOGY: Refer to Tasmanian Government Bulletin for detail (Bulletin No.38) but for the purposes of this report it is sufficient to say that the underlying rock of the whole area, with the exception of the Aplite ore body hereinafter mentioned consists of the younger form of granite or tinstone as it is locally named.

The tinstone orebody is of the "floor-deposit" type and occupies an anticlinal fold coursing through the two hills. The ore body at the bottom of the present open cut is about 220 feet wide. The lines of the fold are clearly seen in the faces of the quarry and each floor has been sampled separately as detailed in Table 2. This table shows that each floor is of varying values with better tin-oxide content at and below the bottom of this quarry. Table 2 indicates that by eliminating the poorest layer that the faces of the quarry can be regarded as worth 11s.5d. per ton. (Oxide worth 1s.6d. per lb.)

Table 3 details the results of the bore-hole put down under the personal supervision of the Engineer and as above stated indicates that the stone in the bottom of the quarry is better and worth about 22s. per ton. (This borehole is marked "V" on the plan attached.) This bore also indicates that the layers (or floors) are of increasing thickness in addition to better quality. The total depth of this hole is 14 feet. (Note: The deepest hole in the quarry bottom is 30 feet and is still on stone worth 15s. The present quarry is 20 feet deep and so at this centre of the quarry a 30 ft. face has been proved which will increase to over 50 feet when the original faces have been reached.)

HISTORY: The history of the Michael Tin Mining Co. is here outlined and states that they began the exploitation of the ore-body in 1924. They had a capital of £5,000 and erected a small plant, very badly designed and without classification apparatus. This plant was originally one of Ten head but later was increased to 15 head and treated 300 tons per week at full capacity. Their recovery could not have been more than 60% of the Oxide in the stone. The mill was erected near the Wyniford River which supplies the dressing water ect. This mill is connected to the mine by an iron rail tramway, just over a quarter of a mile long.

As no statistics are available it was necessary to gather information from the Mines Department, Tasmania, and this is set out in Table 4

(80)

and shows that they ran for three years and saved 70 tons of oxide of an assay of average 70%. They crushed about 39,000 tons of stone which averaged .3% oxide and so gave them a gross return of £13,169. (The Bulletin mentions £17,000 but the Engineer thinks that £13,169 is the more reliable.) Fortunately the stone is quite clean and good soft crushing and as the mining and treatment costs work out at 8s.6d. per ton it would seem that had the saving apparatus been installed they would have achieved better results. The whole show appears to have been badly managed as these costs are much too high. Operations ceased at the beginning of the economic slump. Table 5 further details these figures.

It seems that the present faces are round about the value of the stone that they handled and that the present result of their work has been to expose a large body of tinstone of very much better value. (nearly double.)

When operations ceased the plant was taken over by the present syndicate owners who shifted it to the Moon Lease where a patch of high grade stone, 5%, was worked out and operations ceased when this gave out entirely. The Moon Lease is about ¾ of a mile away from the Michael battery site but transport is good. Prospecting has been carried out at the Michael for the greater part of 1933 and the results have been as stated above, viz. that the stone extends laterally, but the values are better in the bottom of the quarry.

MACHINERY: The plant as now erected at the Moon Lease, though in better condition than at the Michael, still lacks classification equipment and the Phoenix Weir tables will need a slight alteration to their decks. A detailed inventory is attached herewith.

For large scale operations the Engineer considers that the Stamp Mill is out of date and that rolls should be substituted. He suggests that the Power Unit and the Crusher be used as hereafter mentioned in his "recommendations" paragraph.

POWER: The Hydro-Electric Department will make available all the power that may be required provided contracts are signed for large blocks but the Michael Mine is not yet sufficiently developed to enable any guarantee to be given, so developmental work should be continued with either Suction Gas Engines or Diesel Engines generating local electric Power that can be distributed where required.

There is ample firewood available for the Suction Gas Units.

WATER SUPPLY: There is ample water available for a small plant without building any dams but the advantages of the Sun-Flat dam site being in the Company's leases is emphasised and adequate water can be stored at a comparative small cost to supply the needs of a mill that can treat 4,000 tons per week or more.

MINING: This paragraph details the results of the company's prospecting during 1933 and mentions that the results are practically the same as the Engineer's Check Bore hole ("Y" on the plan). This prospecting is tabulated in Table 6 and indicates that the stone in the bottom of the quarry is worth round about 22s. per ton. 9 (Nine) holes, in addition to the check bore were put down by the company and all are very consistent in their values. Table 7 details the bores put down by the company outside the quarry and at an average distance of 75 feet and these, though of lower grade than the holes in the bottom, show that the stone is round about the values crushed by the old company as above mentioned. The deepest hole inside the quarry is 30 feet and other than this one the holes average 12 feet. The deepest hole outside the quarry is 18 feet and the others all average 10 feet.

Developmental mining should be continued by bringing in another level at 20 feet which with 12 - 15 feet lost in the present open cut, will eventually give a face of 60 feet, being maximum drainage level, when the walls of the old quarry are reached.

Table 8 goes into mining costs details and various methods are

tabulated; the information was compiled from the Engineering and Mining Journal of December, 1932. Various methods are mentioned and are:- Block caving, open stoping, sub-level caving, and shrinkage. He mentions the large mine in America (Alaska-Juneau) that treats about 11,000 tons per day that mining costs are down as low as 1s.2½d per ton. It is also on record that the Anchor Mine in Tasmania (about 3 miles away from the Michael) in 1906/7 treated 153,738 tons of stone at an average cost of 2s.3d. per ton (mined and milled).

The Engineer considers that the Michael Mine properly equipped with Air Drills etc. should be delivered to the mill (in the trucks) for 1s.8d. per ton of stone as the stone is soft and on account of floors and vertical joints breaks easily. Below drainage level the costs will be greater but should not be above 5s. per ton. He states that until the mine has been further developed in systematic fashion so as to arrive at a fair estimate of the ore reserves he cannot recommend the type of mining to be employed for large scale operations.

METALLURGY: This paragraph deals with the pulverisation of the tinstone and the subsequent classification of the tin oxide and its concentration. Table 9 here shows the results of a number of screen tests to determine the size mesh to reduce to. (Note: In the addenda to the report the engineer suggests that if the financial position of the company allows the Stamp Mill to be discarded and Rolls put in their stead that they should work in closed circuit with a 10 Mesh Screen- Trommel or Impact - thence undersize to callow or Impact 20 Mesh and through this to Jigs.)

Attention is drawn to the fact that the Michael stone and the oxide is clean and so offers no obstacle to concentration.

THE APLITE BODY: The results of assays here do not come up to the values mentioned in the Bulletin No.38 but the body should be further tested and exploited as should sufficient values and tonnages be disclosed it is possible to work this lease by hydraulic methods. (Note: The Bulletin No.38 mentions that the Aplite is very soft and of a milk white colour and appears to average 0.25% but states that no assays were actually made).

ECONOMICS: This paragraph mentions that the renewal of the Tin Price Stabilisation Convention for another three years assures a reasonable price for the metal, and round about the present price £225 (plus the exchange). Bulletin No.38 suggests that stone of an average value of 0.20% (oxide) is a payable proposition if worked on a large scale in this district but the Engineer in this paragraph does not agree with this contention entirely, but he states that as the values at the Michael appear to be more than double this assay (i.e. round about 0.50% oxide) he has no hesitation in placing the following recommendations before the Directors. (½% stone is worth at the present time about 17s. per ton.)

RECOMMENDATIONS:

(1) A survey on a large scale plan should be made contoured at not less than 20 feet Vertical Interval etc.

(2) That the present Suction Gas Plant be removed from the Moon Mine and re-erected at the Michael Quarry and used to test the ore reserves above drainage level with compressed air drills.

(3) If this check drilling is satisfactory to bring in a cut from the lowest point in relation to the mill site and,

(4) Erect a mill with a scientific Flow Sheet capable of treating 200 - 250 tons of tinstone per day. This would be a "Pilot-Mill" and eventually form a Unit of a larger plant,

(5) To construct a Dam at the Sun Flat in proportion to the scale of operations.

(6) Instal at the Mill Site or near, Suction Gas or Diesel driven Generator to furnish Power for this Pilot-Mill until the Mine becomes sufficiently developed to enable guarantees to be given to the Hydro-Electric Department for blocks of Power.

ORE-RESERVES: Using the bore marked "V" as a check on the prospecting of the Company below the quarry bottom, and taking the statements as definite for the surface tests (statements of the company's prospectors) it seems safe to assume that above drainage level some 75,000 tons of tin-stone is available, worth 10 lbs. of Oxide to the ton which at present prices is worth 15s. per ton; there is also an indefinite tonnage of stone above the floor of the present open cut worth approx. 6 or 7 lbs. of oxide to the ton of stone or in terms of £.s.d. about 9s. (Note: the Engineer in the course of his investigations drilled the "V" borehole and Channel sampled the faces.)

DIAMOND DRILLING: Until the results of the above recommendations are safely ascertained an extensive campaign of diamond drilling is not recommended. If the results are as anticipated then a sum of £7,000 should be set aside for this work and with the success of these operations the future of the mine would be assured even though a very large sum would have to be utilised to exploit the property on the larger scale of 4,000 tons per week.

FINANCES: The capital of a Company to initially develop the property if it stands the tests of the above recommendations (prior to diamond drilling) would be not less than £30,000 distributed as follows:-

(a)	For Mill, Power Generating Plant, Water Supply and Tramway		£20,000.
(b)	For Mine Equipment and Development	£3,000.	
	and for Diamond Drilling	£7,000	£10,000
			£30,000

SUMMARY: The report finally concludes as follows:-

"With success with initial work a very large sum would be required to provide for the exploitation of the property on a large scale but then apart from the effect of Market Fluctuations in tin price, its future would be assured.

I consider that the Michael Mine has excellent prospects if tested properly with adequate capital on the lines mentioned in this report."

Yours faithfully,

(Signed) T.H. Vincent

MINING ENGINEER.

Comments by the Secretary of the Syndicate.

Notes: The report was made during November, 1933.

The plan of the Open Cut mentioned in paragraph "Geology" shows the quarry to be almost circular and about 200 feet in diameter. This quarry averages about 20 feet in depth and shows the position of all the prospect holes which are placed so as to give a fair indication of average content. The deep hole - 30 feet - is in the centre and the others are all round the middle distance towards the sides. One of these holes is 17 feet deep and is going well over the 1% value, but we look to this to maintain the average ½%. Three of the other holes are of ¼% value (all in terms of oxide).

The Company had a highly experienced and reliable miner (who for sixteen years was with the Anchor Tinstone Mine nearby until its operations ceased in a large way in 1914) in charge of its recent prospecting and the drill holes were pumped out every 6" and special care was taken with the deep hole of 30 ft. which took two weeks to sink and cost alone £15. The bottle pumping apparatus used was reliable because at 23 feet the tin content was practically nil for a distance of 2ft. 6 in. and then at 25ft. 6in. it came in again and is still on ston e that assays ½%. The first 23 feet bulks .70% oxide.

The Company consists at the present time of ten members who are determined to again get started so as to get a good face of tinstone showing, and with air drills and contract work in the face will be in a position to have a developed proposition to put before a more powerful financial group. It is anticipated that by the expenditure of £1,500 and the allocation of a quarter interest to those who will join the original 10 that this work can safely be put in hand and so the explanation why the present syndicate (referred to as Company) would appreciate the employment of shareholders who are experienced.

It is anticipated that there is at least 300 tons of oxide in sight in payable stone (even with the improved plant that £1,500 would give, the stone should pay well.)

An inventory of the present Plant is enclosed herewith and it is doubtful if it could be replaced under £5,000 (including the Tramway)

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Inventory of Machinery Plant and Equipment.

10 Head Battery complete with Driving Pulley, Cam Shaft, two (2) Five-head battery boxes also many spare Shanks, heads, discs etc.
Spare Driving Pulley.
" Five Head Battery Box.
" " " Cam shaft and webb cams.
" (Fifteen head cam shaft and a few cams -- (see note below).
(This Cam shaft is still personal property but is available, cheap).
3 Self-feeders.

1 Stone Crusher ("Jacques") - 16"x10".

1 Suction Gas Engine (Rushton & Hornsby) -- 32 H.P.
1 do. (Crossley) - 46 H.P. (out of commission).

1 Commonwealth Gas Producer plant (50 - 100 H.P.)

1 Charcoal Burner for gas producer (out of commission but suitable for an air receiver.)

2 Concentrating Tables (Phoenix-weir)

3 do. (Wilfrey) (two of these out of use)

200 feet of Tail Race and Dressing Shed equipment.

1 Friction Winch (large size).

2 Air Compressors; one of these in good order being a converted "Dodge" car engine up to 90 lbs pressure, the other of low pressure up to 28 lbs.

2 Air Receivers up to 100 cu. ft. capacity (approx.)

1 Jack hammer

1 Motor engine 2½ H.P. (Used as a pumping unit) - kerosene fuel.

1 Dynamo and Electric Lighting Plant.

1 Circular Saw and Bench.

3 Centrifugal Pumps - 1½"

50 feet of Elevator (belting and buckets)

500 feet (approx.) or more of Transmission Belting of various sizes and in good order - "Balata" and other makes.

100 feet (approx.) of Intermediate Shafting 3", 2½", 2", 1½" (The greater proportion being 3")

25 Pulleys suitable for the above shafting - fast and,loose etc.

Storage bin and its heavy oregon timber (12"x12") etc.

880 yards approx. of tramway (600 yards still in position)

12 trucks - ¾ and 1 ton.

1000 feet of Piping - mostly 2" and suitable for air and water (galv. iron).

100 feet of piping (hose) 1" approx. and suitable for air or water.

3 Accommodation huts of large size (house at least 20 men)

1 Blacksmith's shop and its appropriate equipment.

1 Battery building, covered with galvanised iron and substantially built with heavy celery spars for main studs and rafters etc. (Note: this building covers the whole plant including the crusher, storage bin, stamper battery, engine and gas producer, saw-bench and concentrating plant and dressing shed etc.)

All necessary mining tools and equipment, e.g. picks, shovels, drills, hammers, jumpers, pipe-vices, stocks dies, grindstone, anvils, axes etc. spare timber and bed logs etc.

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MICHAEL MOON TIN MINING COY N.L.

SKETCH PLAN OF OPEN CUT AT MICHAEL MINE.

BORE HOLES ⊙ $\frac{\text{DEPTH IN FEET}}{\text{TIN OXIDE, LBS PER TON}}$