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THE ABERFOYLE MINE, ROSSARDEN, TASMANIA.

The Aberfoyle Mine is situated at Rossarden in north-eastern Tasmania. Rossarden is connected by road, 14 miles in length with Avoca on the State Railway system. The mine is being operated by Aberfoyle Tin No Liability.

Tin-bearing quartz veins were discovered about 1926. Systematic exploratory and developmental work was conducted in succeeding years and a treatment plant erected and milling operations commenced in September, 1932. Up till 30th June, 1941, the company reports that it treated 121,607 tons of ore for a recovery of 2,530.86 tons of tin concentrates and 240 tons of wolfram concentrates with a gross realised value of £485,222 and paid £92,514 in dividends. The present annual rate of production is 323 tons of tin concentrate and 26-tons of wolfram concentrate.

The mineral deposits are quartz veins in Cambro-Ordovician slates and quartzites. The veins strike in a general north-south direction and dip to the west. A large number of veins have been intersected in the mine workings and particularly in the Nos. 1 and 2 adits. The attached cross section through Speirs (No.1) Shaft illustrates the vein system. The following section reported by the company as being exposed in the western portion of the main cross-cut from Speirs Shaft is generally typical of the distribution of the veins and their widths.

Distance from Shaft
(feet)

Width of Vein
(inches)

7	6
39	5
66	8
70	2
73	8
79	3
85	10) 20 West
87	10) Drive
92	18
97	30
102	3
106	12
111	24
118	5
148	2 (40 West (Drive

Only the larger veins, or a group of two or more veins when spaced sufficiently closely, are mined. The veins driven on during 1940-41 had average widths ranging from 9 to 48 inches. The number of veins worked at each level ranges generally from 2 to 4 or more. The maximum length of development at any one level is about 1600 feet, but the most important development occurs along a length of 900 to 1200 feet and the maximum length of stoping is about 900 feet. A plan of the mine workings is attached.

Levels have been opened up as follows -

Intermediate	50 feet
No. 1 Level	120 "
No. 2 Level	220 "
No. 4 Level	400 "

The No. 1 Adit is connected with the No. 1 level and the No. 2 adit with the No. 4 level. There are two working shafts sunk to the No. 4 level.

The quartz veins contain cassiterite and wolfram, which are recovered during milling operations. The veins also contain pyrite, arsenopyrite, chalcopyrite, marmatite, galena, pinito, etc.

Stoping has been restricted to the veins above No. 2 level and only a small amount of ore has been obtained (during development) below that level. The chief veins that have been stoped are Nos. 26 and 50.

The company's report gives the ore reserves at 30th June, 1941, as follows -

Above Nos. 1 & 2 levels	9,646 tons of average grade
	21,255 tons under average grade
	30,901

The reserves between Nos. 1 and 2 levels are subject to reduction in amount because of rejection of waste rock to improve the grade. The ore reserves between Nos. 2 and 4 levels are estimated at 62,212 tons of a type between positive and probable. At the present rate of production (16,000 tons per annum) the reserves represent about 5 years' supply of ore.

The veins persist downwards to the No. 4 level and there is thus the probability of developing further reserves at depth. The position at depth may be affected by the Aberfoyle fault. This fault occurs on the eastern side of the mineralised zone and is approximately parallel to the veins. It appears from the mine sections that the fault is dipping to the west but at a less angle than the veins, and might therefore intersect the veins at depth. Mr. Q.J. Henderson, Field Geologist of the Tasmanian Geological Survey, stated in a verbal communication that the Aberfoyle fault had, where measurable, a downthrow of 400 feet to the west.

The lateral limits of the veins, or the zone containing the veins has not necessarily been reached and there is scope for further exploratory work. To the south the mineralized zone is covered by younger rocks and surface prospecting is impossible. Consideration of a geophysical survey is warranted to some extent, although the geological conditions are such that the prospects of success are not bright. Drilling from the workings of the southernmost shaft appears to be the most satisfactory method. A cross fault near the western end of the No. 4 adit may have possibly displaced the veins.

The attached flowsheet shows the treatment used for the concentration of the cassiterite and wolfram. Gravity concentration is practised for the recovery of cassiterite - wolfram concentrates, which are enriched by the elimination of the sulphide minerals by batch flotation. The resulting mixed concentrate is passed through magnetic separators for the separation into cassiterite and wolfram concentrates. The milling results for three months ended 31.3.42 were -

	Tons	% Wt.	% Tin.	Distribution % Tin.
1. Mill Feed	4220.0	100.0	1.988	100.0
2. Primary Tailing	3792.0	89.8	0.17	7.7
3. Secondary Tailing	292.0	6.9	1.20	4.2
4. Primary Float Concentrate	12.5	0.3	2.00	0.3
5. Secondary " "	8.1	0.2	2.40	0.2
6. Wolfram Concentrate	16.9	0.4	0.70	0.1
7. Tin Concentrate	98.5	2.3	74.64	67.48

The numbers refer to the positions marked on accompanying flowsheet. The wolfram concentrate assays 72 to 73 per cent

tin oxide. The introduction of flotation has been successful in raising the grade of tin concentrate from 68 to 69 per cent. tin to 74 to 75 per cent tin. The grade of ore treated in 1940-41 was reported as 1.534 per cent. metallic tin.

The mill recoveries are very good and are considerably assisted by the coarse grain size of the constituent minerals of the ore. The secondary tailing and primary flotation concentrate should, however, be stacked with a view to future treatment.

The production of ore has steadily increased from 10,000 tons per annum in 1933-34 to 16,000 tons in 1939-40 and 1940-41. The company is therefore producing at the maximum rate consistent with its scheme of operations. The company employs 99 men and normally works two shifts underground for 5 days per week, and 10 hours per day in the mill for 5 days per week. The number of men are sufficient for the present scale of operations.

The company has a nominal capital of £150,000 of which £62,500 has been subscribed and paid-up. At 30th June, 1941, it had paid £92,514 in dividends and had reserves of £16,750.

The position regarding increased production is as follows--

- (1) With the present number of employees, production could be increased only by the working of longer hours per week. In recent months, the company suggested to the employees that 6 days instead of 5 should be worked per week. This arrangement was agreed to and the amount of ore mined and treated per week rose from about 330 to 390 tons. Other companies and mines in Tasmania did not make similar arrangements and, on 8th April, the employees informed the management that it was desired to discontinue the arrangement until other mines adopted it, or it was otherwise arranged.
- (2) Larger scale production would be possible by the employment of a larger number of men, but would be subject to certain conditions.

On the mining side, it has to be realised that the mineral deposits being worked consist of several narrow quartz veins with a considerable range in width. In order to have sufficient supplies of profitable ore to ensure continuity of operations the company very wisely keeps development work sufficiently far ahead of extraction to provide 5 years supply of ore. Any greatly increased rate of production would therefore affect the company's policy and seriously affect the possible profitable working of the mine in the future. Any arrangements for greatly increased production should therefore be accompanied by other arrangements to accelerate the rate of development so as to ensure at least 5 years ore-reserves at all times. The additional extraction of ore and development work would require additional manpower and probably also additional compressor equipment and drilling machines. Present compressor equipment consists of two machines - one of 600 c.ft. and one of 400 c.ft per minute capacity.

As regards the milling, the working of more hours per day would cope with an increased production up to the maximum that could be handled with the present mill working 24 hours per day i.e. $\frac{24}{10} \times 330$ or 792 tons per week approximately (for 5 days). This would involve the working of a night shift and the company is concerned about supervision, but such a matter could be arranged without much difficulty.

- (3) In attempting to arrange increased production from mines, the financial aspect has to be considered from several viewpoints including return of capital and wastage of assets. This is particularly the case because of the proposed war-time regulations allowing a return of only 4 per cent on capital employed. Provision should be made for return of capital (where necessary) by means of a depletion allowance and special taxation concessions for increased production. This is especially desirable in the case of mining companies engaged in mining strategic minerals such as tungsten; the consumption of which is largely dependant on armament industries.

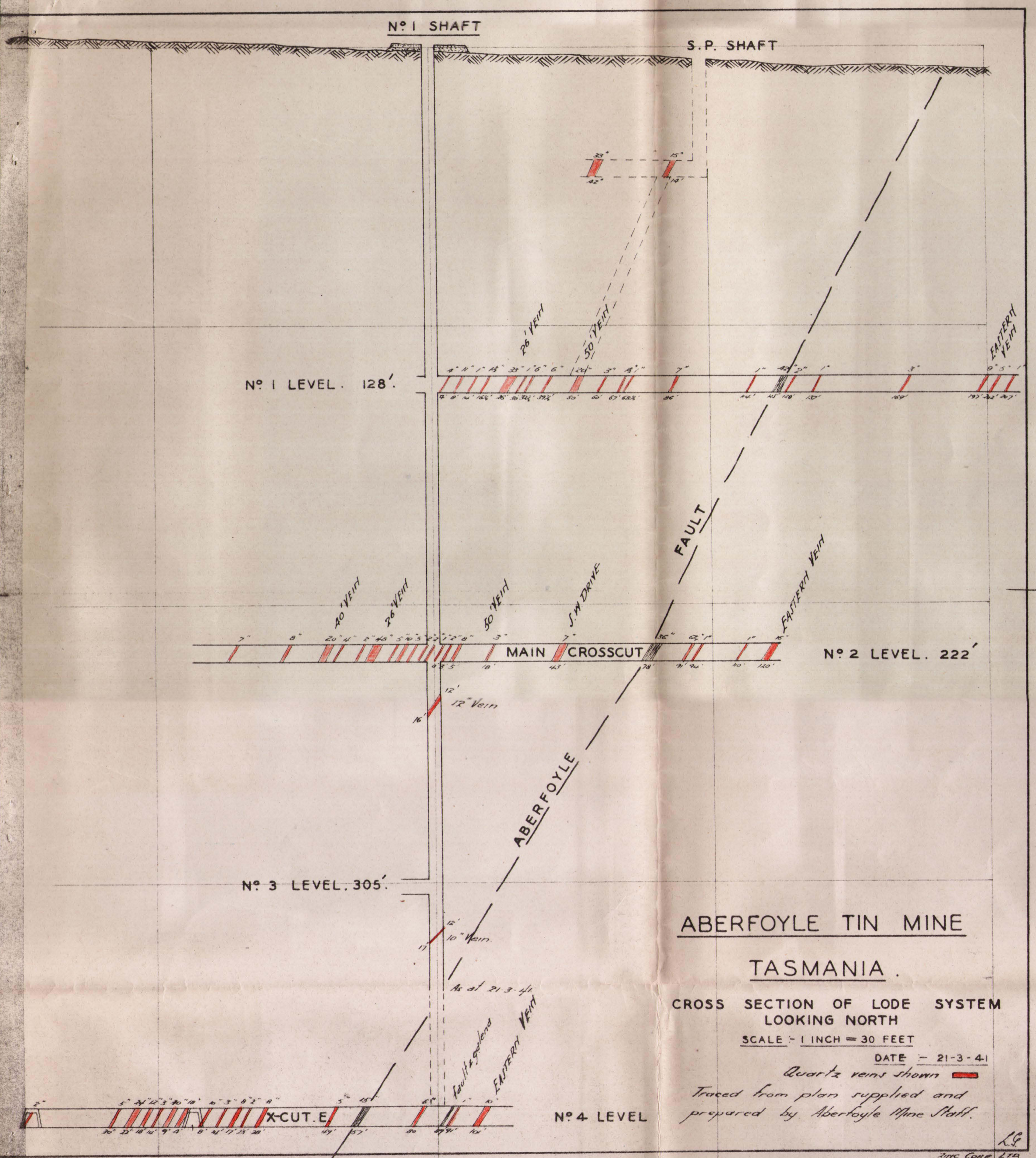
The Aberfoyle Tin, N.L. has paid £92,500 in dividends on a capital of £62,500 in a period of about 9 years. It could be said in general that the amount of the capital has been returned and a profit of approximately 5 per cent per annum made. The sum of £92,500 has however been distributed as dividends and treated as such for taxation purposes and not as return of capital. The capital (or the market value of the mine and plant) has therefore still to be returned and a depletion allowance is necessary to permit its redemption, particularly in view of wartime taxation. Arrangements should be made therefore so that whether the present rate of production is maintained or an increased rate brought about, a depletion allowance should be allowed to permit of return of capital (or of market value of mine and plant). Further, a special taxation concession should be granted for any increased production.

If an increase above the present annual production of 323 tons of tin concentrate and 26 tons of wolfram concentrate is required from the Aberfoyle mine, it is recommended that -

- (1) The mine and mill be worked to the full capacity of the mill on a 24 hour a day basis. This would necessitate the weekly production and treatment of ore being increased from 330 to say 750 tons per week. The annual production of tin concentrate would be increased from 323 to say 734 tons and of wolfram concentrate from 26 to 59 tons. Such an arrangement would involve the provision of additional man power (probably 50 to 70 men) for development and stoping in the mine and for the mill. It would be a necessary condition of the arrangement that development should be accelerated so as to maintain ore-reserves sufficient for 5 years. Additional compressor plant and drilling machines would probably be required. Financial assistance would probably not be necessary. As in the cases of other mines endeavours should be made to have arrangements made by the Commonwealth Government for taxation concessions for a depletion allowance and for increased production.
- (2) In the event of extra man power not being available, that consideration be given to general arrangements for the greater utilisation of existing man power by working more hours per week. Any such arrangement should be a Governmental and an Australian-wide one.

(M.A. Mawby)
MEMBER, MINERALS COMMITTEE.

(P. B. Nye.)
ASSISTANT GEOLOGICAL ADVISER.



ABERFOYLE TIN MINE
TASMANIA.

CROSS SECTION OF LODGE SYSTEM
LOOKING NORTH
SCALE - 1 INCH = 30 FEET
DATE - 21-3-41

Quartz veins shown █
Traced from plan supplied and
prepared by Aberfoyle Mine Staff.

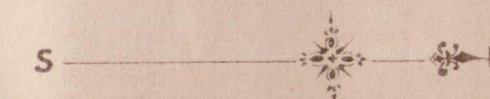
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- INTERMEDIATE LEVEL APP. 50 FEET.
- N° 1 LEVEL 120 FEET.
- N° 2 LEVEL 220 FEET.
- N° 2 ADIT 400 FEET.
- N° 4 LEVEL 400 FEET.

ABERFOYLE TIN MINE, TASMANIA

PLAN OF WORKINGS AS AT 30-6-41

SCALE:
→ 100' TO SQUARE →



Traced from plan accompanying Aberfoyle Tin Mts. Lixibility Annual Report 1941