

1945/33
C.1

1945/33

Mount Bischoff Tine Mine

by

C.L. Knight

c3

DEPARTMENT OF SUPPLY & SHIPPING

MINERAL RESOURCES SURVEY BRANCH

MOUNT BISCHOFF TIN MINE,
Supplementary to Report No. 1944/47 (Dec. 1944).

REPORT NO. 1945/33.

1. INTRODUCTION

A report was prepared in December, 1944 on the ore reserve position at the Mount Bischoff Tin Mine. Since that date, further field work has been carried out, and the additional observations made have rendered necessary a revision of conclusions advanced in that report. The present report is to be read as a supplement to the previous one, but supercedes it in many respects. A revised summary of the ore reserve position is given herein.

The additional geological observations affect both the interpretation of the structure of the Mount Bischoff ore-body as a whole, and the interpretation of the structure of individual ore occurrences.

2. ADDITIONAL DATA.

A. General. 1. The shale wall which extends along the whole length (600 feet) of the southern half of the western boundary of the open-cut, and which in previous reports was considered to be a fault, has now been shown to be a dip face, the wall paralleling bedding in the shale. This wall has a general bearing of 35°W, and constitutes the western limit of replacement mineralisation.

2. Field mapping was extended for 2,000 feet west of the shale wall, on the surface and in the Bischoff Extended Mine workings underground. Steeply dipping bedded shales parallel the shale wall for some 300 to 500 feet west, at which distance dips flatten to horizontal and undulate flatly for 1,000 feet. The implication of this is that the favourable beds lying above the shales in the open-cut area were folded up on a strong north-south anticline, and have since been eroded.

3. The mapping northwards from the northern rims of the Brown and North Faces shows the same conditions to hold, i.e. the favourable bed has been eroded.

4. Specimens of the fine-grained grey dolomite, which occurs over such an extensive area in the southern part of the open-cut, were selected and submitted to the Tasmanian Mines Department for analysis. It is now reasonably certain that this rock is a dolomitised limestone bed, interbedded with the shales and quartzites of the area. A thickness of at least 100 feet is proved in one place.

B. Greisen Orebody. 1. Development work has been confined to the completion of the leading stope which extends now over the full length of the No. 1 Drive.

2. The shale wall, which constitutes the western boundary of the orebody in the drive, must now be interpreted as footwall shales brought onto a north-south strike by strong folding. This implies that the interpretation of the geological structure as shown on section line A, Plate 2, report 1944/47, must be revised.

3. Partial testing of the block of mineralised ground above the western tributary stope has been accomplished by the boring of auger holes to about 10 feet depth downwards from the base of the overburden shale. All holes intersected very low grade ore.

C. Pig Flat. 1. In the five month period 2/12/44 to 21/5/44, 13,000 tons of ore have been quarried with an average mill head value of 0.58 per cent Sn (chemical assay) and a mill recovery of approximately 0.14 per cent. Sn. As soft low-grade ore was included, the grade of the hard ore mined would be at least 0.7 per cent. Sn. Hard ore has been proved for 120 feet along the strike and seventy feet across the strike.

2. The hard ore showing in the face and wings of the central 50 feet by 50 feet part of the cut consists of pyrrhotite, marcasite, pyrite in a carbonate-talc-chlorite gangue. This is identical with ore found in the western section of the Greisen orebody. The facemen reported that typical talcose ore was pierced in drill holes ahead of the face.

3. Two 12 foot horizontal drill holes ahead of the face pierced some rich ore, one hole showing a minimum width of six feet of 2 per cent. ore (Vanning assay).

4. Dip of heads in the face are 40° to 45° to the south. The footwall shales are some 40 feet north of the face and dip south probably at 45° .

D. Greisen - Pig Flat Mineralisation. The pyrrhotite-pyrite-carbonate type of mineralisation has now been proved to extend from the western end of the Greisen orebody to the eastern end of the Pig Flat - approximately 700 feet.

E. North Valley Mine. 1. Limited driving on the Nos. 2, 4 and 5 levels has not proved payable thicknesses of ore beyond present stope limits.

2. Vein contouring of the reef has been carried out and the results indicate that the southern limit of the shoot has probably been reached.

3. The No. 7 level is being cleaned out, and a haulage has been erected. A short shoot of rich ore has been found where the crosscut intersects the reef. This level is 100 feet below No. 5.

3. INTERPRETATION OF GENERAL GEOLOGY

The openout deposit was formed essentially by mineralisation of the basal section of a group of beds overlying shales and quartzites. Beds higher in the sequence have been involved in the mineralisation, but this basal section, some 40 to 120 feet thick, has yielded the bulk of the tin ore produced at Mount Bischoff. The rocks were probably limestone or dolomite and were easily replaced by the sulphide and tin-bearing solutions.

In the northern half of the openout, the beds were thrown into domes and basins with major east-west axes (see report 1944/27 and 1944/47). In the domes, the footwall shales reached almost to the surface, while in the basins were preserved the deposits which yielded a large percentage of the tin ore obtained from the mine. Practically all mineralised material has been removed from this area.

The basal mineralised zone outcrops along the northern edge of the southern half of the cut and dips steeply to the south. Evidence of folding is seen in the southern area and it is thought that the beds flatten out from the steep dip to form folds analagous to those in the northern half, but concealed under dolomite.

In the southern half of the cut, a large tonnage of mineralised material remains, and the future of the mine depends on this area.

The general geological set-up of the southern half depicted in plan at Main Tunnel Level (herein referred to as M.T. level) is as follows:-

Along the western side of the opencut is a zone of mineralisation some 600 feet long, with a general trend of N.35°W. The footwall of the zone (i.e. top of the footwall shales) dips steeply east along the whole length. The hangingwall is not well defined. The ore in the zone has been opencut to M.T. level over a 500 foot length and to a width of up to 80 feet in places.

At its northern end, the above zone curves at right angles to a N.65°E. bearing and continues on this trend for 300 feet. This is the Greisen orebody, which has been described in detail in previous reports. The mineralised zone still occupies a position immediately above the footwall shales and comprises the basal 50 to 100 feet of the favourable beds.

East from this point the zone continues on the east-west trend for 200 feet and then swings sharply south on a north-south cross-fold, to resume the east-west trend once again at Pig Flat, and continues on this trend through to the eastern end of the White Face - a distance of 600 feet. The richer mineralisation at Pig Flat is contained within the basal 80 feet of the favourable beds.

Throughout most of the 1,800 feet length involved, mineralisation is known to plunge underfoot beneath M.T. level. (600 feet trends north-south at the western end of the cut and 1,200 trends east-west from the western end of the Greisen orebody to the eastern end of the White Face).

Along the eastern edge of the cut shales occur overlying dolomite and the mineralised beds. They are thought to have been overthrust into this position.

Along the southern edge, shales outcrop to the south of the dolomite and mineralised beds. The nature of the relationship cannot be determined from surface evidence.

The extensive area of the opencut enclosed between the mineralised zone on the north and west and the shales on the east and south, is occupied by dolomite, dolomite breccia, and extensive low-grade mineralisation. These are considered to represent a zone higher in the series than the mineralisation of the Greisen orebody and its extension. No footwall shales outcrop anywhere in this area.

4. EFFECT OF NEW OBSERVATIONS ON ORE RESERVES

A. Above Main Tunnel Level.

1. Greisen Orebody: Underground development work has not been of the type to affect ore reserve estimates.

The different interpretation now placed on the nature of the western termination of ore implies that a revision of the ore shoot boundaries shown on section line A (report 1944/47) is necessary. The difference which this will make in the tonnage estimates is difficult to assess, but on the whole it is considered that the figure of 21,500 tons of probable ore west of section line B can be retained.

Probable reserves above M.T. level are, therefore, 65,000 tons of probable grade 0.85% Sn. Some additional ore

developed by crosscutting south from the western end of No. 1 drive. As stressed in my last report, the pattern of distribution of tin shoots within the Greisen orebody is still to a considerable extent unknown and cannot be determined without actual mining, or considerable development work. The above estimate is probable are only, but it is expected that it will be realized in mining and may well be exceeded.

The 65,000 tons referred to above has been proved by driving and drilling within a 250,000 ton block of mineralized zone. Some 80,000 tons of this block has not been tested and some of the remainder inadequately tested. Further development work may increase the above figure substantially.

2. Pig Flat: In Pig Flat section, quarrying over the past twelve months has revealed that hard ore of probable average grade of 0.7 to 0.8% Sn. occurs over a length of 120 feet and a width of 70 feet at M.T. level. Footwall shales are about 40 feet ahead of the face.

Probable tonnage of mineralisation between face and footwall and extending to the east to the porphyry dyke is about 60,000 tons, of which at least 15,000 tons, and probably much more, is expected to be of a grade of about 0.7% Sn.

3. Area between Pig Flat and Greisen: Between these two ore occurrences, mineralisation is continuous on the surface. The structure at M.T. level is impossible to determine without some drilling, but it seems probable that a belt of mineralisation, some 70 feet to 120 feet wide will follow the folded footwall shales around between the two orebodies. This belt would contain at least 200,000 tons of mineralised material and probably very much more. Doubt about the position of the footwall in the region of the north-south fold makes a more accurate estimation of tonnage impossible. This ore is of the same type as the Greisen orebody. Tributaries have taken ore from several points on the surface, but otherwise the grade is unknown. The new developments in Pig Flat strengthen the possibilities of locating the important tonnages of ore in this block.

4. White Face: This is an extension of the basal mineralisation. Some 50,000 tons of ore, mostly of low grade with some richer patches, could be expected above M.T. level.

5. Southwest of Pig Flat: This mineralisation is not the main basal band. Some 50,000 tons have been proved of grade 0.18% Sn. (Vanning assay).

6. In report 1944/47, the 32,000 ton block of mineralisation above the tributaries slope on the western end of the Greisen orebody was thought to contain about 25% of ore. On recent sampling, the block cannot be regarded as ore.

B. Below Main Tunnel Level.

A 25 foot band of ore is known to plunge under M.T. level along the 260 feet of No. 1 Greisen drive. In Pig Flat, 70 feet or more of ore continues below M.T. level and in the White Face area also this has been proved to be the case. Along the western wall mineralisation continues underfoot.

If we take the 1,800 feet of mineralised basal zone over a width of 70 feet, the amount per foot of depth is about 10,000 tons.

Mineralisation other than the above is known to extend below M.T. level.

Within the southern half of the opencut, mineralisation may extend over a considerable area under the dolomite, and it may well be that ore, perhaps in very considerable tonnage, may be located by diamond drilling.

C. North Valley Mine:

Reserves above No. 5 level are 10,000 tons of grade 0.9% Sn.

Driving of the No. 7 level for 1,400 feet, or alternatively winzing from No. 5 level for 100 feet and driving for 600 feet, would possibly develop some 25,000 tons of ore of similar grade in the main shoot on the main reef. Other smaller shoots would probably be disclosed during the driving.

The East Lode between No. 7 and No. 5 level will probably contain 4,000 tons of grade about 0.9% Sn.

5. SUMMARY OF PROBABLE AND POSSIBLE ORE.

A. ABOVE MAIN TUNNEL LEVEL.

1. Mineralisation: Altogether some 600,000 to 800,000 tons of mineralised material above Main Tunnel level has been indicated in this report.

Greisen Orebody	250,000 tons
Pig Flat	60,000 "
Between Pig Flat and Greisen	200,000 - 400,000 tons
White Face	50,000 tons
Southwest of Pig Flat	50,000 "

Other areas not considered, because of the complete inadequacy of data, would bring the total to somewhere near 1,000,000 tons.

2. Proved Ore:

Greisen Orebody. About 150,000 tons of this mineralisation has been reasonably well tested, and 65,000 tons of ore of grade 0.85% Sn. is considered probable.

Pig Flat. 15,000 tons of the 60,000 tons of mineralisation in sight can be assumed to assay 0.7% to 0.8% Sn.

Southwest of Pig Flat. 50,000 tons of grade 0.18% Sn. (Vanning assay) have been proved by drilling.

3. Possible Ore: Some 400,000 to 600,000 tons of mineralisation (apart from the inadequately defined blocks indicated in the last sentence of section 1 above) require testing for grade. Some of this is undoubtedly low-grade, while some of it is known to be high-grade (approaching 1% Sn).

The untested sections of the Greisen orebody, Pig Flat, and the section between Pig Flat and Greisen, comprising probably some 350,000 to 550,000 tons are of prime importance. Mineralisation is of the same type throughout these three parts. On the east and west ends, higher grade ore is known to occur and, on the surface at several places, tributaries have worked payable patches. No guess as to average grade is justified on present knowledge, but it can be stated definitely that some high-grade ore will be found. Developments in Pig Flat, at the least, brighten the prospects of the block. A diamond drilling campaign of up to 2,000 feet would test grade.

B. BELOW MAIN TUNNEL LEVEL.

1. Mineralisation: In section 4B a width of 70 feet was assumed for the basal mineralised band over a length of 1,800 feet. This gave a figure of 10,000 tons per foot of depth.

In the Greisen orebody, Pig Flat and White Face, however, this band is about 120 feet wide, and widths along the western edge of the cut range up to 120 feet. In addition, there is other mineralisation going underfoot. On the whole, therefore, the above figure is conservative, and to indicate the maximum extent of mineralisation could be increased to 20,000 tons per vertical foot. This would give 1,000,000 tons to a depth of 50 feet. It should be stated, however, that below the M.T. level, this mineralisation has been tested at only three places. A drill hole below the Main tunnel proved mineralisation to a depth of 60 feet. At the western end a drill hole started about 50 feet from the footwall shales proved mineralisation to a depth of 40 feet before entering the shales. At the eastern end a short tunnel proved ore to a depth of about 20 feet below M.T. level. In the absence of any testing no allowance is made for the mineralisation extending beyond a depth of 50 feet.

2. Probable Ore : Of the above the only ore which can be regarded as reasonable assured, in the absence of testing, is 25,000 tons of grade 0.85% Sn. in the Greisen orebody, 25,000 tons of grade 0.7% to 0.8% Sn. in Pig Flat, and a further 40,000 tons of low-grade ore outside the basal band.

3. General Possibilities: The basal band is considered to occur under dolomite in the southern half of the opencut. This will be folded and is expected to occur at moderate depths. A diamond drilling campaign would test the very definite possibilities of the block.

Diamond drilling is also necessary to determine whether mineralisation and ore extend outside the opencut limits on the southern and eastern sides.

C. NORTH VALLEY MINE.

Reserves above No. 5 level are 10,000 tons of grade 0.9% Sn.

Development work on No. 7 level would be expected to develop some 29,000 tons of ore of similar grade.

(C. L. KNIGHT)
Geologist.

CANBERRA, A.C.T.
13th July, 1945.